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Eastern terminus in the Port of Montreal of the great inland waterway that extends 1,223 miles from the lower lock of the Lachine Canal to Fort William, and even further to Duluth. Although small foreign steamers of less than 260 feet and drawing no more than fourteen feet pass up through the St. Lawrence canals, ocean navigation proper ends at Montreal.

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The St. Lawrence Seaway — Navigation Aspects

by DANIEL W. HOAN,
President, Great Lakes Harbours Association, Milwaukee

WHEN JACQUES CARTIER sailed up the Gulf of St. Lawrence in 1534 to claim the great wilderness of Canada for France, he unwittingly forged the first link in a chain of events which led ultimately to a bitter fight to win for the Great Lakes area a deep water outlet to the sea. In Cartier's footsteps followed a great line of explorers and colonizers — Champlain, Père Marquette, Jolliet, and LaSalle—all of whom foresaw the need for a direct water route from the sea to the inland empire of North America. It was almost 300 years ago that the first efforts were made to by-pass the rapids of the St. Lawrence River to carry the bateaux of the French fur traders safely around the rapids. The dream persisted for three centuries, and is stronger than ever today. Three centuries ago, the river's traffic consisted of furs and trade goods for the western Indians. Instead of Indian canoes and bateaux, modern man visualizes the passage down the St. Lawrence of great ocean steamers carrying the agricultural and industrial wealth of the Middle West to the seaports of the world.

The seaway project is again before the people of the United States and Canada. Speaking to a joint session of the Senate and the Commons in Ottawa on June 11, 1947, President Harry S. Truman of the United States said:

> Gratifying as the volume of our trade now is, it is capable of even further expansion to our mutual benefit. Some of our greatest assets are still to be developed to the maximum. I am thinking of one particularly that holds tremendous possibilities, the magnificent St. Lawrence-Great Lakes system which we share and which we must develop together.
>
> The St. Lawrence project stirs the imagination of men long accustomed to majestic distances and epic undertakings. The proposal for taking electric power from the river and bringing ocean shipping 2,400 miles inland, to tap the fertile heart of our continent, is economically sound and strategically important.
>
> When this program is carried out, the waterway that is part of our boundary will more than ever unite our two countries. It will stimulate our economies to new growth and will speed the flow of trade.

The development of the navigation and power resources of the Great Lakes-St. Lawrence system has been envisioned for half a century by the United States and Canada as a joint international enterprise. It is frequently said that the St. Lawrence seaway will add a fourth coastline to the United States. It will indubitably open the interior of the North American continent to ocean shipping and will harness 2,200,000 horse power of hydro-electric energy now running unused into the Atlantic Ocean. The navigation benefits and the electrical energy to be generated would be shared equally by the United States and Canada.

It is the writer's purpose to discuss the practical navigation aspects of the seaway and its effect upon the Great Lakes harbour cities of the United States and Canada.

The St. Lawrence River and the Great Lakes are undoubtedly the most important single factor in the transportation system of the North American continent, for both Canada and the United States. The Great Lakes and the St. Lawrence system draw much of their freight from Canada's western prairies, from Winnipeg's industries, and from the forest and mineral resources of Ontario and Quebec. The river flows past Montreal to serve Canada's metropolis, as well as the great port of Quebec and the Maritime Provinces.

The completion of the seaway is important to the Canadian people, but it is of even more urgent importance to a large section of the United States. Canada's population of eleven and a half millions would undoubtedly be greatly benefited by the project. On the American side of the boundary, however, some forty million people, resident in states tributary to the Great Lakes, would derive direct and important benefits from the project.

Freighters coming up Detroit River at opening of navigation. City of Detroit at right and Windsor, Ontario, at left.

The mutual interest of both countries in its completion is reflected in the growing recognition of its need. It is noteworthy that the earlier opposition of the ports of Montreal and Quebec to the project has largely been dissipated in recent years, undoubtedly due to an appreciation by these Canadian cities that what is good for the vast interior of the continent is good for them. They have recognized that their welfare and prosperity is intimately related to the welfare and prosperity of western Canada and the midwestern United States. The port interests of Montreal and Quebec, no doubt, have perceived that a free flow of water commerce to and from the Middle West by the St. Lawrence River will bring new traffic to their doors and will open western markets to them.

Those parts of the United States and Canada served by the Great Lakes-St. Lawrence system are not only great in population, but are great in agricultural and industrial resources. These natural arteries of water transportation serve the great coal and iron fields of the United States on Lakes Erie and Superior. They penetrate to the heart of the Middle West at Chicago—the second city of North America, its greatest railroad centre and outlet for wheat, corn, and livestock of the Middle West. Detroit, also on the Great Lakes, dominates the motor manufactures of the world. Most of the production of agricultural implements is on or close to the Great Lakes.

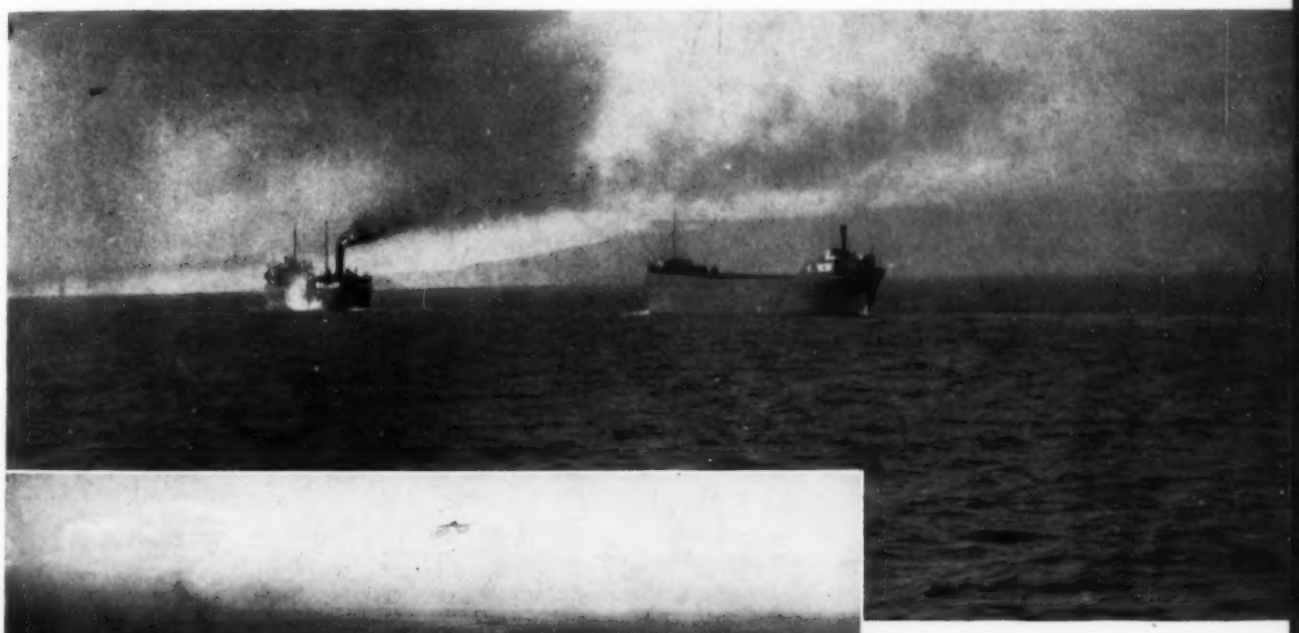
During the war years, the commerce moved on the Great Lakes exceeded 200,000,000 tons annually, and in years of normal business activity, the commerce of the lakes frequently approaches this figure, which far exceeds the waterborne commerce of any single coast of the United States. Much of the foreign trade of the United States and Canada originates in or is consigned to midwestern destinations. A region of such intense industrial activity, of such great resources, and with a large stake in foreign trade, can justifiably demand better access to the ocean and improved methods of marketing its produce.

It has long been recognized that the Middle West is handicapped in terms of foreign trade because of its distance from the seacoasts, necessitating a costly rail haul

before goods can be brought to shipside at salt water. On both sides of the international boundary, there is a growing recognition of the need and a great sentiment for the project. Every president of the United States who has considered the Great Lakes-St. Lawrence seaway has endorsed it in the most unequivocal terms. Presidents Wilson, Harding, Coolidge, Hoover, Roosevelt, and Truman successively have strongly recommended the project to the United States Congress. Presidential support of the seaway has been backed enthusiastically by many labour, agricultural and industrial leaders, together with a host of governors, mayors, public officials and citizens in every walk of life.

It has been said that the economic benefits of the project would rival those of the Tennessee Valley Authority and the Panama Canal combined. The opening of the Middle West—the world's greatest production centre, both agricultural and industrial—to ocean shipping holds even greater promise to both countries than the opening of the Suez Canal held for the Far East, or the Panama for the Pacific Coast. Only eight countries of the world produce more electricity than would be produced by the power now running unharnessed into the Atlantic.

It is a natural law of water transportation that ships will penetrate inland as far as possible before discharging their cargoes, to extend the benefits of low-cost water transportation to the farthest point. The proof of this natural law is demonstrated by the location of many great seaports—for example, Baltimore, at the head of Chesapeake Bay; New Orleans, 110 miles up the Mississippi River from the Gulf of Mexico; London, at the head of the Thames

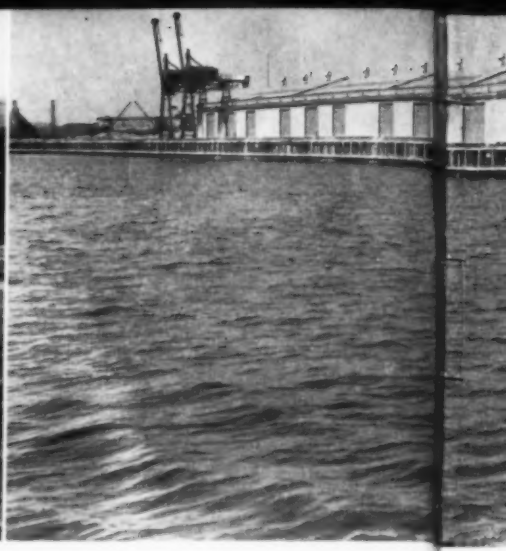


Above: — Freighters on Lake Superior

Left:—Fort William and its harbour.

The outer harbour at the Port of Milwaukee, showing a tanker discharging gasoline, a lake bulk freighter discharging a cargo of rosin, and a Canadian canal type steamer discharging wood pulp. These facilities were planned to serve lake shipping and in preparation for the St. Lawrence seaway.

Milwaukee Journal photo



Municipal Transit Shed No. 1, o Milwa especially to ser lakes-

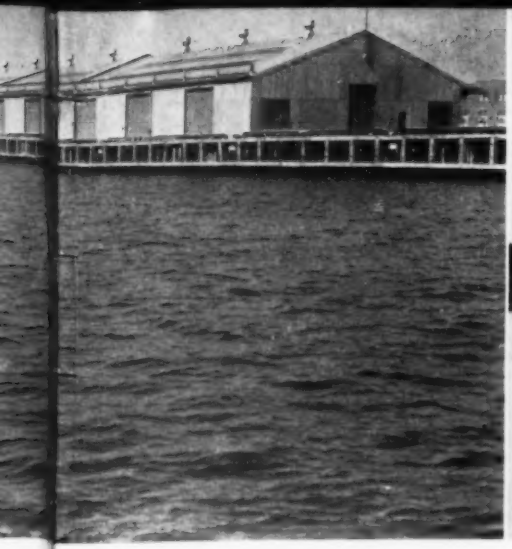
estuary; and Montreal, at the head of ocean navigation on the St. Lawrence, a thousand miles from the open sea.

The obstructions to deep draft navigation west of Montreal have made Montreal the terminal port for deep draft ocean shipping and have halted the workings of this law of transportation on the St. Lawrence River. If the rapids did not exist, the main port would undoubtedly have been located farther from the sea, at the head of ocean navigation. Similarly, if the St. Lawrence in its entirety offered a safe and deep draft channel into the Great Lakes, lake ports would have long since engaged in ocean commerce. The construction of locks and dams to by-pass the rapids of the St. Lawrence will permit ocean shipping of substantial tonnage to reach Great Lakes ports, thus demonstrating on an incomparable scale the effect of this natural law of transportation.

In spite of the barriers presented by the St. Lawrence rapids, ocean shipping has penetrated the Great Lakes for almost a century. For example, early historical records of Milwaukee show that as early as 1856, cargoes of wheat were shipped by schooner from Milwaukee directly to Liverpool, followed by other direct shipments of grain, lumber, meat and hides. In 1861, forty vessels sailed from Great Lakes ports to European destinations, and this trade continued throughout the 1860's and 1870's.

This trade went into eclipse for several decades, but was briskly revived after the World War I, when new trade routes were being sought. The St. Lawrence gateway, then neglected by North American shipping interests, was recognized by European ship owners as a potentially profitable trade route. Small British and Scandinavian vessels, able to carry about 1,500 tons of cargo through the 14-foot channels of the St. Lawrence canals, were chartered to haul bulk commodities from European ports to the Great Lakes. These vessels usually carried china clay, wood pulp, manganese or fertilizer inbound, and relied primarily on midwestern and Canadian grain for return cargo.

Importers and exporters enjoyed substantial rate savings by using these direct vessels, despite their small size and limited cargo capacity. As a result of these rate savings, general cargo began to appear on the manifests of Great Lakes-European cargo steamers. In 1933, a Norwegian steamship company, the Fjell Line, inaugurated the first direct Great Lakes-European vessel service on regular schedule, employing small but speedy ships, specially designed for the service. In 1938, a Dutch shipping company, the Oranje Line, established a second regular



Milwaukee Outer Harbour, designed lakes-ocean vessels.

Dutch steamer "Prins Willem III" of the Oranje Line entering Milwaukee harbour on her maiden voyage in 1939. She is typical of the small but modern ships constructed specially for the Great Lakes-European trade.
Milwaukee Journal photo

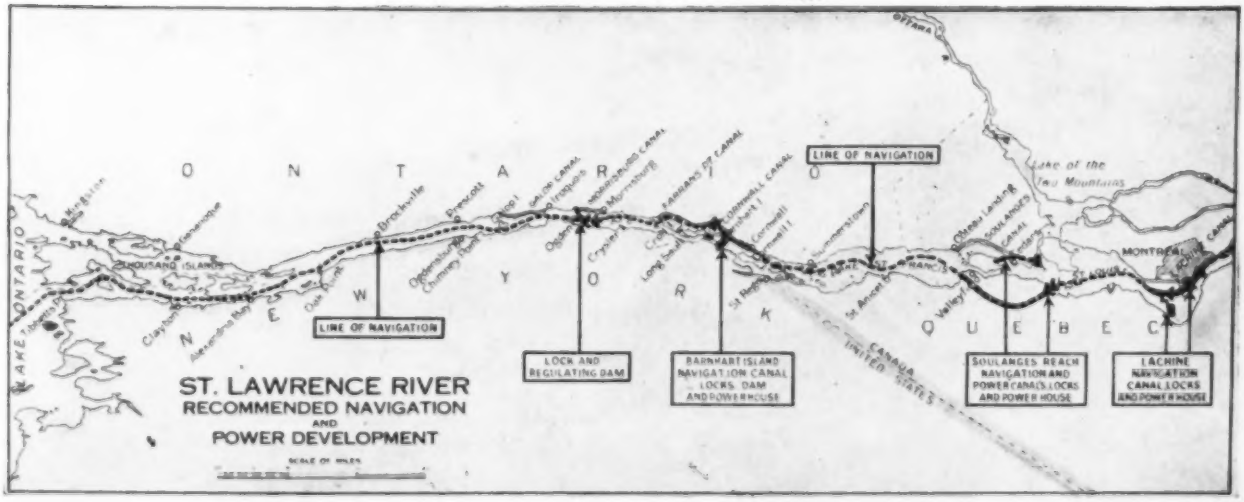
service from the Great Lakes to northern European ports. Two additional lines were established under the Swedish flag in 1946 and 1947. Thus four ocean lines are now regularly serving Great Lakes ports.

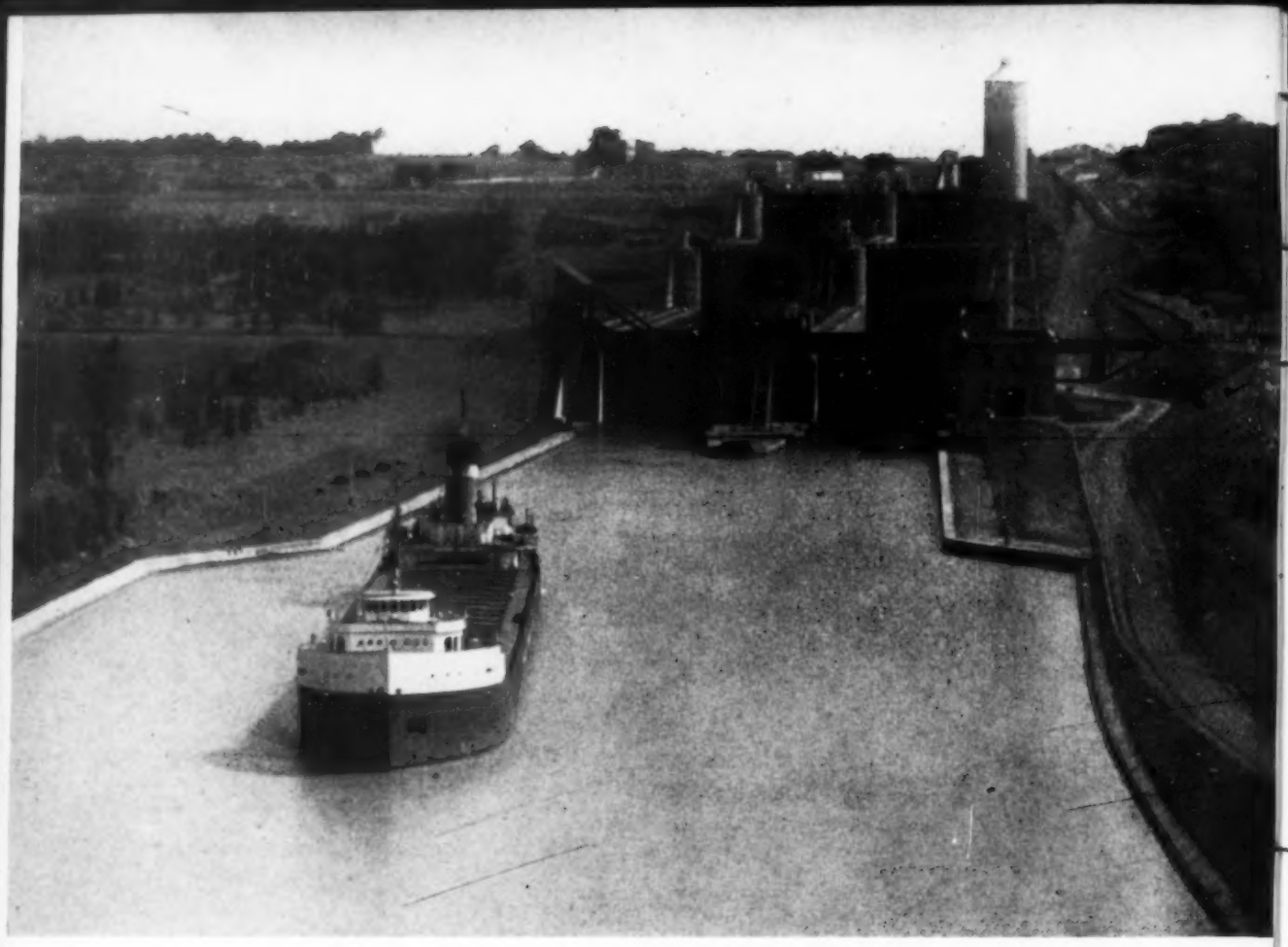
Despite the hazards of war, a dozen ships made the run from Europe into the Great Lakes in 1940 and even during the critical year of 1941 a few of these ships arrived at Canadian and United States ports on the Lakes.

These vessels offer substantial savings in freight rates as compared to the traditional method of routing traffic to the seaboard, thence via ocean vessel to destination. As a result, midwestern industries on both sides of the boundary are able to market their produce in Europe in competition with producers on the Atlantic seaboard, which, in many cases, they would not be able to do under the handicap of high railroad freight rates to the seaboard.

Many graphic examples could be given of freight rate savings, to the benefit of midwestern industry and agriculture, as a result of vessel service from the Great Lakes direct to Europe. These shipping operations have served as a laboratory demonstration of the future possibilities of the St. Lawrence seaway. Grain, wood pulp, wines and liquors, automobiles, machinery, foodstuffs, cod liver oil, and a great variety of other

The scheme of deep draft navigation and power development recommended some years ago by the International Joint Commission on the St. Lawrence.





Locks in the Welland Canal, which extends a distance of 27.6 miles from Port Colborne, on Lake Erie, to Port Weller, on Lake Ontario. There are eight locks in this system, these having a length of 859 feet, a width of 80 feet and a depth of 30 feet. Large lake steamers, capable of carrying half a million bushels of grain, make use of the chain of locks that enable them to circumvent the Niagara Falls.

Bulk freighter in one of the four locks at Sault Ste. Marie, Michigan, which share with one at Sault Ste. Marie, Ont., all traffic between Lake Superior and Lake Huron. The total tonnage passing through these waterways in eight months exceeds that for both the Suez and Panama Canals in twelve months.

cargoes have been shipped with large savings in freight rates.

The writer was much impressed with testimony offered before a United States Senate Committee in 1946 by the Kohler Company, manufacturers of plumbing supplies at Kohler, Wisconsin. The company's principal raw material is china clay, which it imports from England in cargo lots. The Company asserted that over a period of years, it had saved an average of $7.83 per ton in freight charges on china clay by use of direct steamers from England, as compared to ocean service through a North Atlantic port plus an inland rail haul. When importing via North Atlantic ports, its freight charges on china clay averaged forty-three per cent higher than the rates via direct vessels from England to Wisconsin. With average imports from ten to twelve thousand tons per year, this Company saved from $70,000 to $100,000 annually by use of direct steamer service for its import needs.

This company stated publicly that it seriously questioned whether the pottery industry could operate in Wisconsin without the advantage of direct vessel service for importation of clay from England. This is merely one example of what the present limited seaway route means to a single enterprise. Considering the thousands of agricultural and industrial enterprises centering on the Great Lakes which look to foreign sources for raw materials or for export markets, it is not surprising that midwestern industry is enthusiastic about the potential trade opportunities of a deep channel to the Atlantic.

Going back to the Kohler Company, it should be pointed out that eight cargoes of 1,500 tons each are required to supply this company with its china clay imports. Even under the handicap of arranging for eight

Ship channel, St. Mary's River, between Lake Superior and Lake Huron
Photo by Richard Harrington

vessel movements, eight unloading operations, preparing eight sets of shipping documents, and so on, this company makes transportation savings which are sufficient to maintain them in a good competitive position in an interior location. If a deep draft channel to the Atlantic were available, it could serve its requirements by chartering two 6,000-ton cargoes, eliminating great duplication of effort and expense. One need not be an authority on ocean shipping to visualize the even greater economies from the movement of deep draft cargoes. The seaway project thus proposes simply to apply the American tradition of mass-production to import and export traffic in and out of the Great Lakes Basin.

Canada's early history records that the first primitive canals to by-pass the Lachine Rapids were begun in 1700. After the British conquest of Canada, the St. Lawrence canals became one of the chief objects of concern to the British Government, which had in mind both the military and the commercial value of the route. Free and unimpeded navigation between lower and upper Canada became an important objective of the early British governors. Both Ontario and Quebec were fully aware of the importance of canals to the development of Canada, and investigations were made with a view to improved water communication between eastern Canada and the Great Lakes.

As George W. Stephens, Canadian authority on the St. Lawrence waterway, has well said: "When the Union was being effected, it was apparent to all that the encouragement of trade between the two Canadas by providing a navigable waterway between them for lake-going vessels would avail more towards solidification of the interests of the two provinces than would any act of Parliament."

In later years, commercial considerations displaced military motives as incentives to the enlargement of the St. Lawrence canals. The growth of lake traffic and the increasing size of steamers made further improvement of the canals imperative. The work of the Canadian Commission during the 1870's resulted in the construction of the Lachine, Soulanges, Cornwall and Williamsburg Canals, with a controlling depth of 14 feet.

Canada must be given credit for great enterprise in the construction of the new

Welland Canal*, with its locks 800 feet long, 80 feet wide, and 30 feet deep, capable of handling the largest lake vessels, as well as any ocean ships likely to utilize the seaway. The Welland Canal is, of course, a most important link in the present waterway system of the Great Lakes, and is an essential unit in the seaway development. The seaway project contemplates enlargement of the present small canals in the St. Lawrence River to dimensions comparable to those of the Welland. Although the seaway project contemplates a depth of 27 feet in the St. Lawrence Canals as compared to the Welland's 30-foot draft, many seaway advocates contend that the seaway project should make provision for 30 feet of draft ultimately, even though the initial units are limited to 27 feet.

It is interesting to note the progressive development of the great locks at Sault Ste. Marie, which by-pass the falls of the St. Mary's River, and at the Welland Canal, which surmount the tremendous barrier of Niagara Falls. Canada and the United States have demonstrated their engineering ability and their will to overcome the physical barriers to efficient navigation on the Great Lakes. It is only a question of time until they will, by joint effort, overcome the remaining obstacles preventing free navigation on the St. Lawrence.

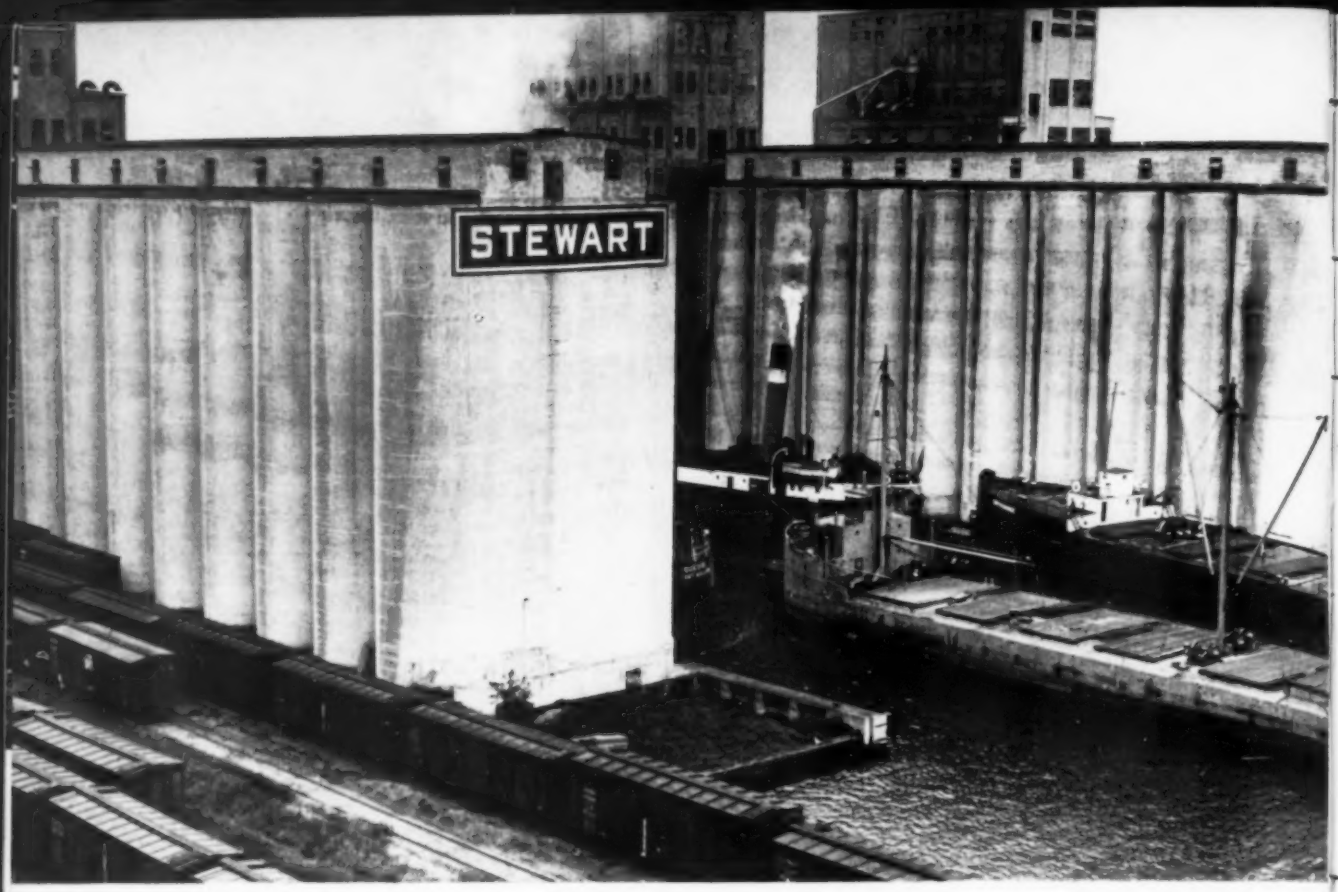
The seaway project has been traditionally opposed by eastern ports which fear that ocean commerce and shipping will be diverted to the St. Lawrence route; by eastern trunk line railroads, which maintain a highly competitive attitude toward Great Lakes water transportation; and by utility interests, which are hostile to the development of electrical energy by public agencies such as the New York State Power Authority which, on the United States side, would develop and control the new power facilities in the St. Lawrence.

The attitude of these opposition groups is that the traditional forms of trade and commerce must be preserved regardless of the economic stimulus which the seaway would give to twenty states and to four or five Canadian provinces. The opposition declaims that the seaway development is wasteful and unnecessary because it will handle no commerce and will serve no useful purpose. This statement is usually followed with another to the effect that the seaway will ruin eastern ports and eastern railroads because it will divert great volumes of traffic from existing transportation routes. Certainly, one or the other premise must be wrong. If the St. Lawrence will handle the great volume of commerce predicted by its advocates and feared by its opponents, then the Middle West and Canada should have no hesitancy in demanding the benefits to be derived from it.

*See "The Welland Canal" by Lyn Harrington, *Canadian Geographical Journal*, May, 1947.

Ruins of Fort St. Joseph, built in 1796 on St. Joseph Island, District of Algoma. The fort commanded the shipping between Lake Superior and Lake Huron, where today freighters and lake boats pass continually.

Photo by Richard Harrington



Grain elevators, Port Arthur

Photo by Richard Harrington

No one disputes the soundness of the engineering features of the seaway project. It is generally agreed that the International Rapids can be dammed, that canals and locks can be constructed to by-pass them as well as the Soulanges and Lachine Rapids, and that the waterway will readily accommodate ocean vessels. Critics contend, nevertheless, that the seaway will be so tortuous, rock-lined and fog-ridden that it will be hazardous to navigation. It is said that ship owners will not risk their ships in so dangerous a channel. Were these claims true, the construction of the seaway could obviously not be justified. The contentions, however, will not withstand even a superficial scrutiny.

The St. Lawrence route holds no terror for seafaring men, as indicated by the fact that in pre-war years, approximately 6,000 vessels annually traversed the canal system between the Great Lakes and Montreal, averaging one canal passage every hour of the day during the open season of navigation. This included ships moving from the Great Lakes to Montreal, from the Great Lakes to the Maritime Provinces, and from the Great Lakes to European ports. The accident record on the St. Lawrence is lower than that on the Panama Canal, and fog is less frequent on the upper St. Lawrence than it is in inland harbours. During a typical five-year period, there were 2.3 accidents for 1,000 vessel transits as compared with 5.7 accidents on the Panama Canal per thousand transits during the same five years.

The opposition asserts that a 27-foot channel would accommodate only a small part of the ocean-going ships of the world and a negligible portion of the United States merchant fleet. To arrive at this figure, the critics start by reducing the effective draft of vessels using the seaway to 24 feet, on the theory that the difference between salt water and fresh water buoyancy will take

up six inches, and that a clearance of 2½ feet is required between keel of ship and bottom of channel. The 2½-foot clearance is required by the Port Warden of Montreal but only on outbound vessels, for which the channel depth is 32 feet. Requirements for canal-bound vessels are entirely different, only one foot of clearance being required in the St. Lawrence canals.

It is, therefore, clear that the draft of vessels utilizing a 27-foot channel is not 24 feet but more nearly 25½ feet. According to the U.S. Department of Commerce, 71 per cent of the ocean-going ships of the principal maritime nations of the world operate on a draft of 25 feet or less, and 65 per cent of the vessels under American registry, as of December 31, 1939, were in this category.

Allowing for the further fact that ships use up fuel, water and stores on a long voyage which would probably make a difference of 2 or 3 feet in actual draft at Montreal, and that many vessels operate with less than full cargoes, there is little question that many vessels even of deeper draft than 27 feet could utilize the seaway.

Confirmation of these facts was given by the Hon. Edward McCauley, Acting Chairman, U.S. Maritime Commission, in his appearance before a Senate Committee considering the seaway legislation during February 1946. Mr. McCauley pointed out that "the preponderance of vessels transitting the Panama Canal normally have been composed of vessels loaded only to two-thirds of capacity." He stated that a load of 75 per cent of capacity would be typical of vessels which would transit such waterways as the St. Lawrence. He pointed out that Victory ships could utilize the seaway loaded to 80 per cent of capacity and Liberty ships to 85 per cent of carrying capacity. He emphasized that there are many vessels, both in the United States fleet and in world fleets, fully capable of navigating the proposed seaway on a 27-foot draft.

On two occasions, within a quarter of a century, the very life and national existence of the United States and Canada has depended upon the ability of the two nations to build ships in unprecedented numbers and at the greatest speed. During World War II, the Great Lakes area was seriously impaired in its contribution to the nation's shipbuilding effort by the difficulty of sailing sizeable ships out of the lakes and into the ocean through restricted channels. Thus, shipbuilding production on both sides of the Great Lakes boundary was confined to smaller types, and was substantially less than it might have been had the 27-foot channel to the sea been available.

According to the United States Maritime Commission, about 60 per cent of the component parts and materials entering into the United States wartime shipbuilding program, aggregating almost seventy million tons, originated in the Great Lakes area. However, only about 2 per cent of the finished ships, and these limited to small

Looking through door of one elevator across the slip to others at Fort William.

Photo by Richard Harrington

Lake Nipigon
Rainy Lake
Port Arthur
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Lake Superior
Duluth
Ashland
Sault Ste. Marie
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Parry Sound
Georgian Bay
Prescott
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Kingston
Lake Huron
Lake Michigan
L. Simcoe
Belleville
Toronto
Lake Ontario
Goderich
Oswego
Hamilton
WELLAND CANAL
Muskegon
Milwaukee
Port Huron
Sarnia
Buffalo
Lake St. Clair
Detroit
Windsor
Lake Erie
Chicago
Toledo
Cleveland

types, were constructed in the Great Lakes though the region enjoys sheltered harbours, vast industrial resources and a great reservoir of skilled workmen.

Had the seaway been developed with a 27-foot channel to the Atlantic prior to the beginning of World War II, cruisers, destroyers, escort carriers, auxiliary ships and 10,000-ton merchant ships could have been constructed in sheltered Great Lakes harbours. These ships could have been loaded in lake ports with foodstuffs, munitions and material of war—and if this seems like mere speculation, let it be remembered that Detroit was ranked as America's No. 1 arsenal and was closely followed in volume of war production by Great Lakes industrial centres such as Cleveland, Chicago and Milwaukee on the American side, and Toronto and Hamilton on the Canadian side.

Convoys could have been assembled in the sheltered waters of the St. Lawrence and sent to European ports with an ocean crossing 1,000 miles shorter from the Gulf of St. Lawrence than from ports such as New York and Philadelphia. The submarine hazard to our Atlantic life line would have been reduced by one-third in terms of distance. It follows that shipping losses, naval escort requirements, and similar military hazards could have been reduced in proportion to the reduction in ocean mileage by use of the St. Lawrence route.

No one predicts that a *Queen Elizabeth* or *Queen Mary* would have any occasion to use the seaway. The project is designed to serve the pack mules of the sea—the ocean freighters of various sizes and types which move the world's goods from port to port. No doubt, the seaway route will have great attraction as a passenger route, and the ships plying the seaway will undoubtedly be called upon to provide passenger accommodation. The scenic beauty of the route and the unique opportunity to go by water from the Middle West to European, Mediterranean or West Indies ports will have a strong appeal, but this is purely incidental to the primary purpose of providing a new low-cost cargo route.

Setting aside the contentions of opponents, we may accept the conclusions of both Governments that the seaway will be safe and fully navigable. This is the considered judgment of such eminent authorities as the Canadian Department of Transport, the U.S. Department of Commerce, the U.S. War Department, the U.S. Maritime Commission and others. We also have the word of the Department of Commerce which, after the most comprehensive survey on record, concluded that ultimately 40,000,000 tons of traffic would profitably utilize the Great Lakes-St. Lawrence route, consisting in part of traffic using the present system plus the large volume of new business to be generated as shipping operations on the route are expanded and as new markets are tapped. This forecast includes anticipated tonnages of iron ore and petroleum, which will ultimately have to be imported into the Great Lakes area from foreign sources, due to imminent depletion of present mineral reserves in the United States.

What would be the effect of this development on Great Lakes harbours on both sides of the boundary? Obviously, the lake ports of the United States and Canada would be immensely interested in the new shipping opportunities which the seaway would provide. There is a healthy competition between ports all over the world for shipping services and cargo tonnage. Our lake ports are following an ancient and honourable tradition when they seek to expand their commerce and their shipping services. The seaway will bring to these interior ports, heretofore landlocked, an opportunity to participate in the movement of foreign trade to and from the markets of the world.

The development of commerce and shipping will stimulate employment and revenue in port cities wherever located, whether on the Great Lakes or the seaboard. The special characteristics of foreign commerce stimulate employment to a greater extent than does routine domestic shipping.

Ships at the end of a long voyage require replacement of stores, fuel and supplies, which will lead to a great expansion of ship

Duluth, at the western extremity of Lake Superior, whose 49 miles of frontage are lined with forty-six wharves, 21 coal docks, 7 iron ore docks, 24 grain elevators, one cement elevator and several shipbuilding berths. Heavy shipments of iron ore are made from this port, whose annual commercial tonnage ranks second to that of New York in North America.

Photo by Duluth Chamber of Commerce

chandlering in lake ports. Repairs of all types will be called for at the various ports, which will be an additional stimulus to port employment and revenues. Ocean ships require pilots and tug service; their crews and passengers make personal expenditures which, as every port city knows, are a most important source of revenue.

Important as these services and revenues are, they are incidental to the main job of loading and unloading the vessel and distributing its cargo. Cargo must be loaded aboard or discharged from the ship; it frequently requires storage service, and it must be distributed from the port or brought to the port by railroad or truck. These stevedoring and distributing functions are the major sources of revenue for port cities.

As lake ports become distributing points for foreign trade, they will be called upon to supply a greater volume of transportation service to and from inland points. This will result in the expansion of dock facilities, warehouses, railroad terminals and in much new investment in railroad and truck equipment. The services required by shipping add up to a pattern of economic activity, employment and community income which makes readily understandable the fact that since the dawn of time, ports all over the world have been competing for this profitable commerce. The aspirations of Great Lakes ports to share in these benefits are understandable and commendable.

It is not the writer's purpose to discuss at length the engineering features of the seaway development, but rather to discuss the navigation aspects of the project and its probable effect upon lake port cities. Lake ports will unquestionably have to undertake harbour improvement works in order to accommodate the deep draft shipping

which will use the lake harbours once the seaway is opened. Most Great Lakes harbours at present have channel depths of 21 or 22 feet, which will require deepening in preparation for the seaway. This, however, does not present a problem of insuperable cost inasmuch as the expenditures required for deepening of the principal lake harbours will be moderate.

Great Lakes ports will need to provide harbour facilities of modern design to accommodate salt water vessels, which will require prompt dispatch and efficient cargo handling. Many of our Great Lakes cities are located at points where rivers flow into the lake. Such sites were seized upon by the founders of Great Lakes cities, who were entirely reliant upon water transportation and who saw in these locations an opportunity not only to use lake shipping but to extend water transportation to inland points. As a result, industries, docks and warehouses have been developed along the banks of the various rivers which flow into the Great Lakes. Typical examples of "inner harbour" cities are the ports of Cleveland, Buffalo, Chicago, and many others. The design and limitations of existing dock structures along these rivers will, in many cases, prevent the deepening of these inner harbour channels much beyond 23 or 25 feet.

Some lake ports, notably Milwaukee, have taken time by the forelock and in the confident expectation that the seaway will be developed in the near future, have begun construction of outer harbour works, located in deep water, readily accessible to shipping. Milwaukee, for example, has developed a series of outer harbour terminals which have been built with 50-foot piling. At the present time, a 22-foot channel is maintained to serve these outer harbour terminals. At nominal expense and with no danger to dock structures, Milwaukee, merely by

Aerial view of the Canadian lock, power station and steel plant at Sault Ste. Marie, Ontario.

dredging, could readily provide outer harbour channel depths up to 27 or 30 feet to serve the needs of deep draft lake and ocean shipping.

Experience may prove that nominal additional channel depth may serve and will minimize the cost of preparing lake harbours to serve ocean shipping needs. As ocean vessels enter the seaway, they will call at various ports, beginning with Quebec and Montreal, and will discharge substantial portions of their cargo as they progress up the lakes. By the time they reach the extreme range of service, for example, at Chicago or Duluth, they will have substantially reduced their draft. Similarly, on the outbound voyage, they will probably load their cargo progressively, beginning with western lake ports and proceeding toward the east, requiring full draft only in the eastern reaches of the lakes. These observations particularly apply to general cargo ships, although, of course, many full cargoes will be consigned to single ports, and the various ports must be prepared to accommodate particular ships and particular commodities according to the needs of the port and its hinterland.

The desire for trade outlets to the world is a fundamental ambition of every nation, and is a basic consideration in the national policy of most countries. Many European wars have been fought over trade outlets of much smaller significance than the St. Lawrence gateway. The desire for better access to world trade and for deep water shipping is fundamental in the interior of North America.

The seaway will furnish an important new trade route for the United States and Canada. It should go far to aid in achieving our mutual objectives of expanded foreign trade, full employment and a healthy merchant marine. If these objectives are to be attained, both countries must expand rather than restrict their transportation facilities. The full economies of mass transportation can be achieved by bringing deep water shipping into the Great Lakes to supply industry with needed raw materials and to give inland industry and agriculture a better opportunity in export trade.

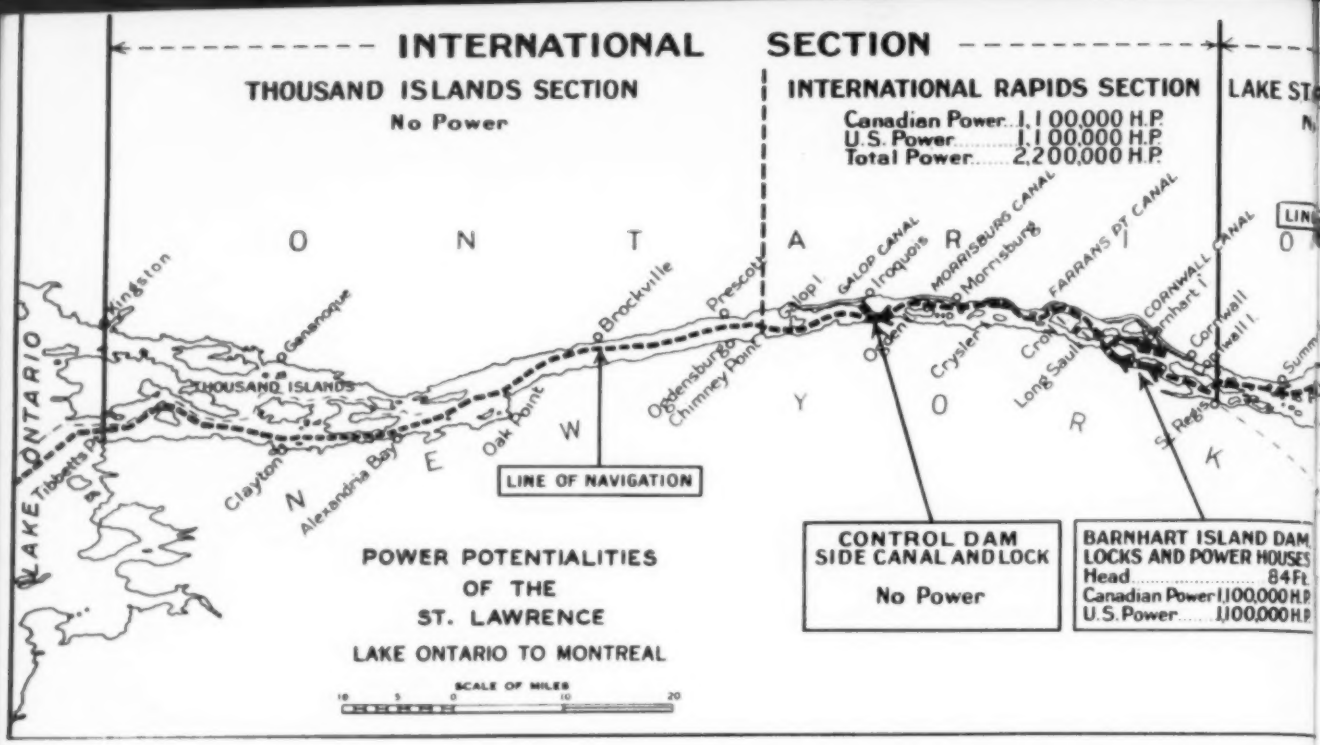
The development of the St. Lawrence seaway and power project jointly by the United States and Canada would give to the world a shining symbol of international co-operation. It would be an enduring example of the ability of two great nations not only to live side by side peacefully but also to develop harmoniously their natural resources. The joint development of a great foreign trade route by two nations for the express purpose of sharing the benefits of new commerce would be a landmark in the history of international relations.

The seaway would be an important factor in expanding world trade and promoting friendly commercial relations. It would strongly reinforce the Bretton Woods Agreement and the economic objectives of the United Nations. It goes without saying that the project would strengthen the traditional ties of friendship between the United States and Canada.

If we are to succeed in developing a new era of peace and mutual understanding between nations, there could be no better beginning than the immediate undertaking of the St. Lawrence seaway and power project.

This lighthouse at Marblehead, Ohio, opposite Pelee Island, Ontario, was erected in 1821 to aid Great Lakes shipping.

International Rapids Section of the St. Lawrence —(above) entrance to the Galop Canal at Iroquois and (below) Cornwall Canal at Mille Roches.



Power Potentialities of The St. Lawrence River

Statement by the Dominion Department of Transport

The St. Lawrence River is divided into two main sections: the International Section extending from Lake Ontario to the head of Lake St. Francis and the National Section extending from the head of Lake St. Francis to Montreal Harbour.

The International Section

The International Section is subdivided into the Thousand Islands Section and the International Rapids Section. The Thousand Islands Section, with a total fall of about one foot, has no power potentialities.

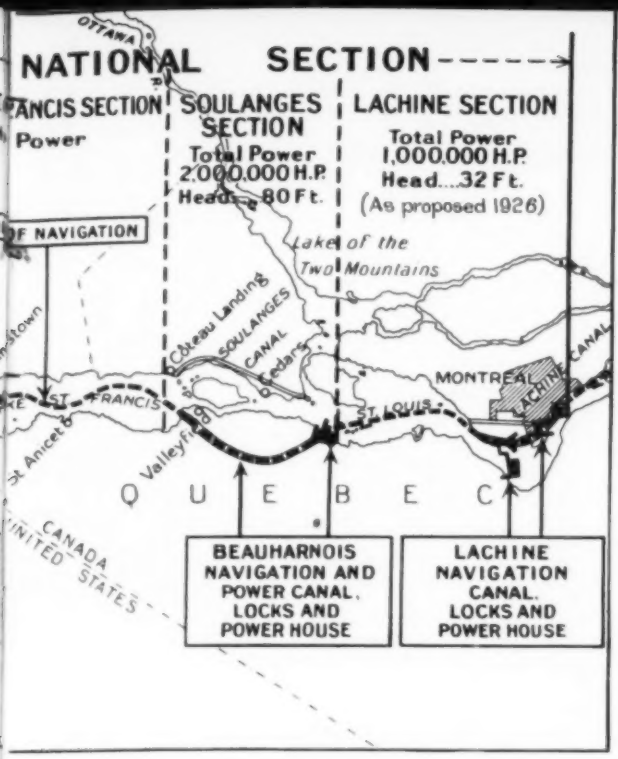
International Rapids Section—The International Rapids Section, 48 miles in length, has a total fall at mean stage of 92 feet. Under the provisions of the Canada-United States Agreement the power potentialities of this section, which total about 2,200,000 horse-power, will be developed in one stage with a dam and two powerhouses, one on each side of the International Boundary at Barnhart Island. The flow available for power purposes will be divided equally between the two countries except for the addition Canada will be allowed equivalent in amount to the waters diverted from the Ogoki River and Long Lake.

A number of small developments using water from the canal systems on the Canadian side whose installations total less than 13,000 horse-power will disappear following the development at Barnhart Island.

On the United States side the St. Lawrence River Power Company has an installation of 86,000 horse-power in a plant at Massena using water diverted from the St. Lawrence River through the Massena Canal. When the full flow is utilized at the Barnhart Island development this plant will cease to operate.

The National Section

The National Section is subdivided into the Lake St. Francis Section, the Soulanges



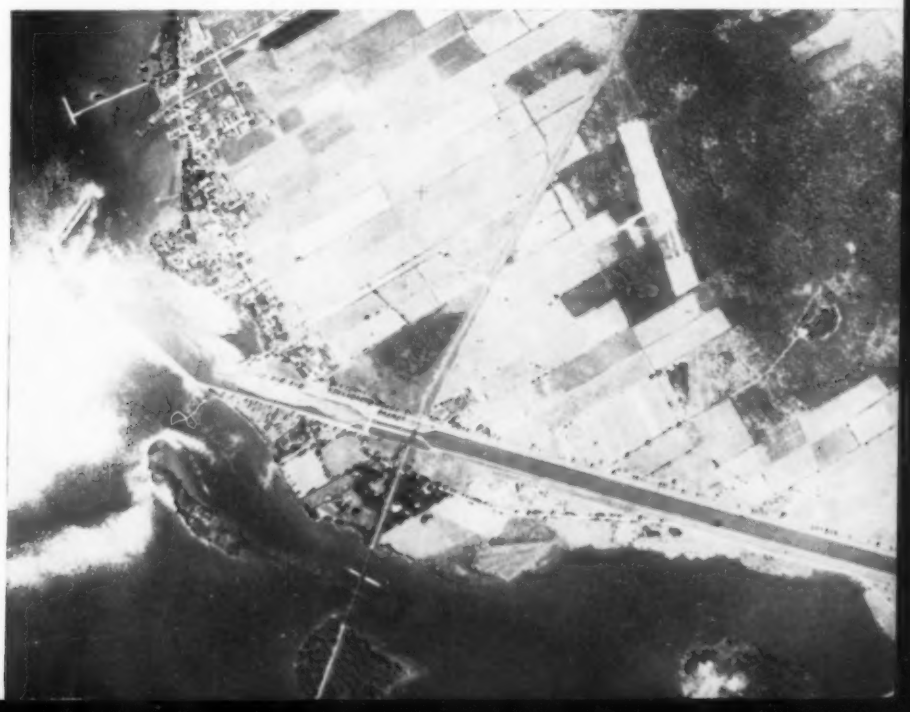
Section, and the Lachine Section. The Lake St. Francis Section has no power potentialities.

Soulanges Section—The Soulanges Section, 18 miles in length, has a total fall at mean stage of 83½ feet. The power potentialities of this section amount to about 2,000,000. The development of this power requires the enlargement by dredging of the existing power canal of the Beauharnois Light, Heat and Power Company on the south side of the river and the extension of the power station at the lower end of the canal on the shore of Lake St. Louis together with tailrace enlargement.

On the main river, at Cedars Rapids, the Quebec Hydro Electric Commission has a power development with an installed capacity of 197,400 horse-power operating under a head of about 32 feet. On the south side of the river at St. Timothée the Canadian Light and Power Company has a plant with an installed capacity of 28,800 horse-power which takes water from the old Beauharnois navigation canal and utilizes it through a head of 50 feet.

The development of the full power potentialities of the Soulanges Section by means of the Beauharnois Power Canal would require the abandonment of the two power developments on the main river but there would be a net gain in ultimate installed capacity of more than 1,000,000 horse-power.

Lachine Section—The power potentialities of the Lachine Section as provided for in the plan proposed in 1926 for the improvement of this section were confined to the reach extending from Lake St. Louis to the foot of the Lachine Rapids where approximately 1,000,000 horse-power may be developed under a head of about 32 feet.



Western entrance to Soulanges Canal.
R.C.A.F. photo

National Parks for Britain

British Official Photographs

Within the compactness of their 58,000 square miles England and Wales contain great geological and scenic variety. Their beautiful landscape is one of contrasts—the rugged mountains and placid waters of the Lake District, the wild moors of the uplands, the green and pleasant farmlands of the valleys, the cliffs and sandy coves of the coast, the shady forests of oak and beech, the smooth undulations of chalk downs, the inland waterways of the Broads and, over all, the heritage of historic places—Roman way, Norman castle, Mediaeval abbey, Tudor manor—and a diversity of plant and animal life.

In 1895 three English philanthropists who were concerned at the loss to the nation of beautiful scenery, architectural gems and historical monuments that were bought up for utilitarian purposes, founded the National Trust for Places of Historic Interest or Natural Beauty. Funds were subscribed by the public and many gifts and bequests of money and property have been made to the Trust. Assistance was also given by the Pilgrim Trust which was founded in 1930 by an American friend of Britain. The National Trust now possesses more than 100,000 acres of the most beautiful and historical parts of the country, which it has preserved for posterity—a worthy nucleus for the national parks. Many generations may be grateful for the far-sighted beneficence of the founders of and subscribers to the Trust. The excellent work begun by voluntary organizations is now to be followed up on a larger scale by the government.

There already exist several national forestry parks, such as the New Forest in Hampshire and the Forest of Dean in Gloucestershire, to which the public has access. However these areas, under the Forestry Commission, are primarily for promoting the interests of forestry and timber production and do not fully take the place of national parks.

For nearly twenty years committees have been considering how best to preserve some of the countryside for public enjoyment. Now the National Parks Committee, set up by the Ministry of Town and Country Planning in 1945, has placed specific recommendations before Parliament.

The plan proposes the establishment of twelve national parks, covering an area of 5,700 square miles, so situated that when the program is completed everyone in Britain will be within fifty miles of one of them. Within the park areas the beauty of the landscape will be strictly preserved and there will be protection for wild life and for places of historic and architectural interest. In addition it is proposed that fifty-two conservation areas be designated, covering another 2,000 square miles. In these areas, under combined local and national jurisdiction, special measures would be taken to preserve their natural beauty and interest, but without the positive management required in the national parks. This scheme would be particularly applicable to coastal stretches, such as the Cornish, Devon and Dorset coasts, where administration as a park would be impracticable.

The program envisages the establishment of four parks each year for three years, and the park areas recommended are: The Lake District, North Wales, the Peak District, Dartmoor, Yorkshire Dales, Pembrokeshire Coast (southwest Wales), Exmoor, South Downs, Roman Wall (Northumberland and Cumberland), North York Moors, Brecon Beacons and Black Mountains (south Wales), and the Broads (Norfolk and Suffolk).

The pictures on the following pages show some of the beautiful scenery to be preserved.

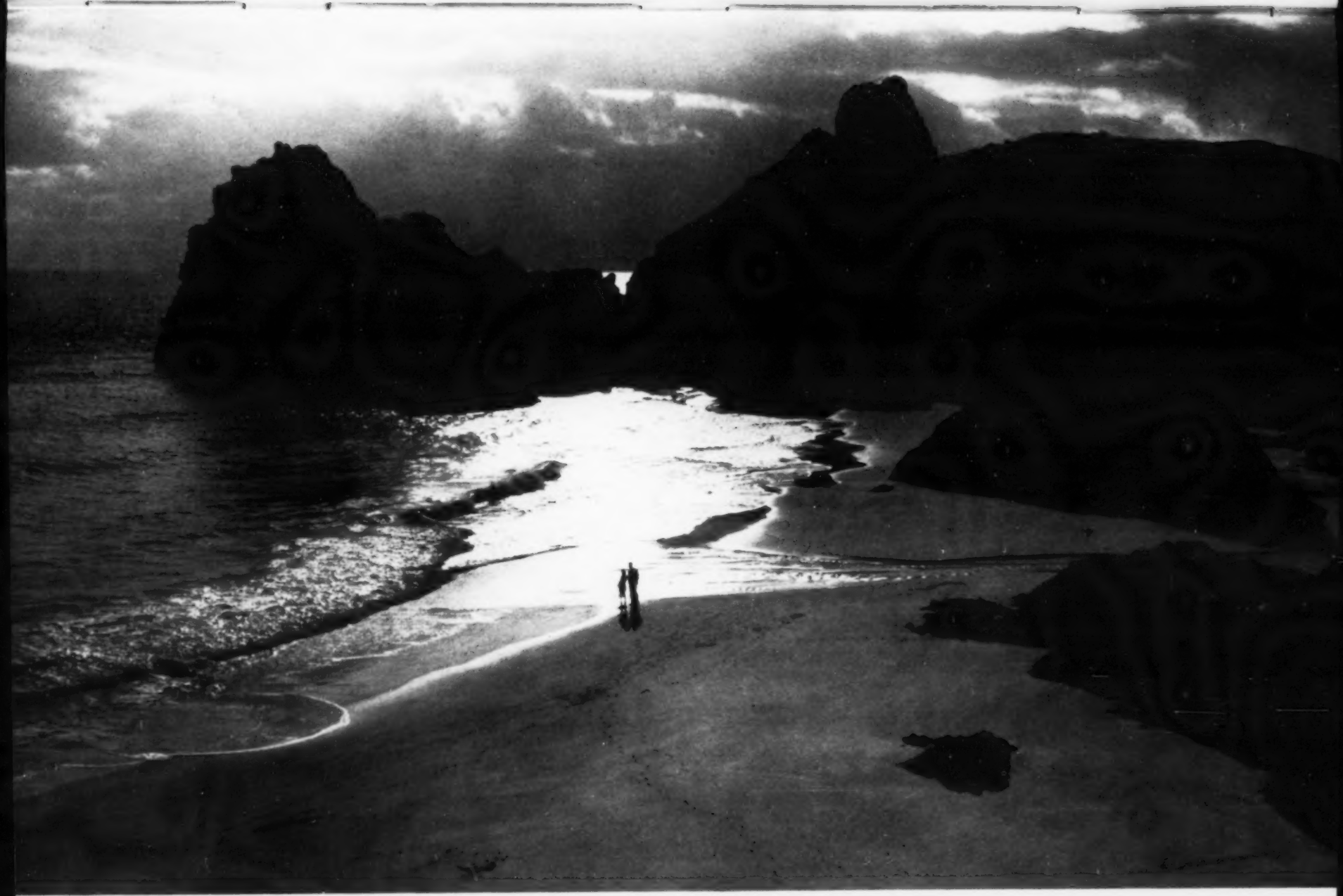
M.B.

Right:—Friar's Crag, Derwentwater, in the Lake District

North Wales. Looking from the gardens of Bodnant Hall across the Conway valley towards the Snowdon range

Aber, North Wales. The wooded glen sheltered between the steep sides of Maes Geer and Ddridd Ddu

Borrowdale Valley in the Lake District, now owned by the National Trust



Kynance Cove near Lizard Point, Cornwall, one of the proposed conservation areas

Coniston Water in the Lake District

The Vale of Conway near Llanrwst, North Wales

The frame building which housed the New Brunswick Legislature on the occasion of its first meeting in Fredericton on July 18, 1788.

Fredericton — Centennial City

by FRED H. PHILLIPS

New Brunswick Government photos except where otherwise credited.

When Fredericton toasts itself upon the completion of its first 100 years of cityhood next July, the passing years will have distilled a draft of oddly varied ingredients. If its bouquet is rare and subtle, the body will be nonetheless earthy and pungent.

The city that has been New Brunswick's capital for 160 years saw the crystallization of a Loyalist oligarchy in the Family Compact of the 1840's; then saw the Compact give place to a new proletariat that arose from the immigrant labourers who came to cut the green wealth of the forests. The growing town watched the trees disappear from the hillsides and float past her riverfront to the mills below. Long lumber became king of a new economy and those who cut it began to voice a new liberalism.

A river traffic on the broad St. John which reached its peak between 1850 and 1870 later dwindled before the advance of the steel rail and finally the asphalt highway.

Came the day when the long lumber industry itself began to decline before a rising demand for steel and stone. But the exploitation of the forest wealth had given rise to a moneyed society and a varied industrialization grew during the last quarter of the nineteenth century. A maturing cultural background paralleled the new industrial trend. Both were to feel the impact and the stimulus of two world wars.

Nowadays four-foot sticks of pulpwood drift idly down the St. John all summer. No paddlewheels churn its placid surface. Only a few pleasure craft buzz about with the noisy importance of internal combustion engines.

Ashore, however, a building boom is making Fredericton the fastest growing city in the Maritime Provinces. Even before the

The home of the United Empire Loyalist Jonathan Odell at the corner of Brunswick and Church Streets, now the Deanery of Christ Church Cathedral.

roofs are on, a seven-storey hotel and four hundred new dwellings are found to be insufficient. The city population, which rose from seven thousand to a scant ten thousand between the wars, is today estimated at eighteen thousand. It will go to thirty thousand by 1965, the forecasters say.

Currently the mayor and city council are trying to guide the restless energy of post-war transition into a long-term policy of industrialization. A town planning commission is conducting a survey of industrial sites, principally with an eye to electricity, water and railway spur lines. Emphasis

Now a government office, this brick house at the corner of St. John and Queen Streets was built between 1810 and 1820 by Everett Winslow Miller (then Sheriff) for Ward Chipman.

A house on lower George Street built as a rectory in the early 1800's with tile brick brought from England.

seems to be on light industries that would find their market through provincial distribution of their products.

Origin of the Town

The French had known the townsite long before the Seven Years War. The Chevalier Robineau de Villebon had built a fort at the mouth of the Nashwaak on the east bank of the St. John in 1692. By 1731 the village of St. Anne's Point was thriving on the pleasant flat in the bend of the great river.

The Fredericton of primary concern here, however, is the one hewn out by Loyalist broadaxes and the stubbornness of a colonial governor after the disastrous close of the American War of Independence.

Coming of the Loyalists in 1783 had meant a rapid expansion at Parrtown (later Saint John) and colonization of the broad river valley that lay inland. Since 1763 all present-day New Brunswick had been a hinterland known as the County of Sunbury in the Province of Nova Scotia. To the newcomers Halifax now seemed remote and overnight there was a clamour for local government. When the colonial authorities in London established the Province of New Brunswick in 1784, Sir Thomas Carleton was appointed its first Colonial Governor.

Sir Thomas immediately declared the site of the ancient St. Anne's Point to be the capital of the new province because it was "central". Right then it was "central" in a wilderness and had not even a road connection with the outside world. Sir Thomas was adamant. He named his new capital Frederick Town in honour of the then Bishop of Osnabruche, second son of the German George III, and went to live there in 1786. The Legislature held its early meetings in Parrtown but in two years time the Governor forced the members over the woodland trails and rivers to far-off Fredericton. A frame building still standing in the capital housed their first meeting there on July 18, 1788.

Material and Cultural Growth

It is difficult to trace the life of the growing community through the first half of the nineteenth century but a series of events may serve to illuminate the major trends. Of lasting importance was Governor Carleton's insistence upon the establishment of the College of New Brunswick in 1800.

When the Loyalists had come to New Brunswick one of their number had been a certain Jonathan Odell. Noted for his satirical verse of Revolutionary War days, history has come to regard him as Canada's first poet. He settled in Fredericton and his house, at the corner of Brunswick and Church Streets, is still in use as the deanery of Christ Church Cathedral. Although the War of 1812 had little consequence in the eastern provinces, a conference was held in the Odell house just prior to its outbreak. Its fireplaces and flues at the time were

The officers' barracks erected in the garrison town in 1828, now the quarters of the Canadian Legion, B.E.S.L.

Looking eastward along Queen Street in the winter of 1832. On the left is the Old Tank House, so called from the pit with iron lining which contained a mechanism for weighing loads of hay. The housing for this apparatus can be seen at the extreme left.

said to have been packed with gunpowder.

Although Fredericton was not incorporated as a city for a number of years thereafter, a Fire Department was created by an Act of the Provincial Legislature dated March 22, 1817. Nevertheless in October 1825 the first Government House and a good part of the town were destroyed by fire.

An expanding lumber industry had opened a wagon road to the Miramichi in 1819 and a road connection with Saint John was opened in 1826.

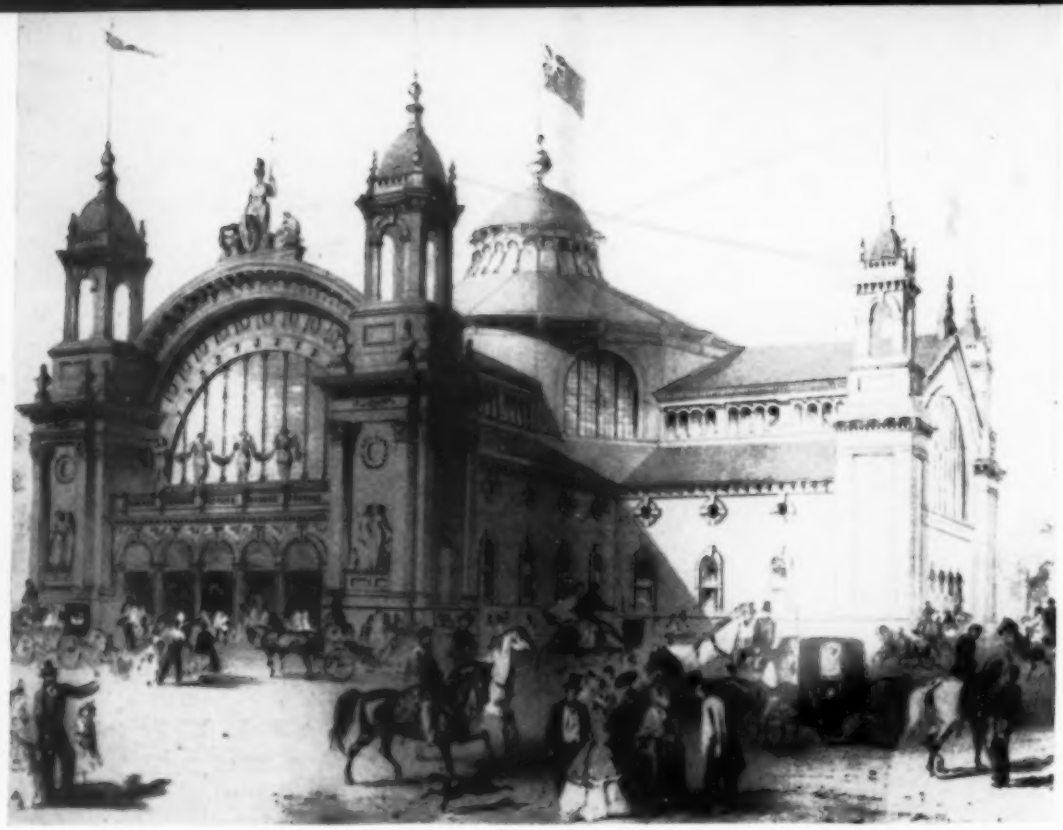
In the Provincial census of 1824 the Town of Fredericton was found to have a population of 800.

At the second annual meeting of the Agricultural and Immigrant Society held in Province Hall on February 19, 1827, plans were laid to hold a Provincial Cattle Show in the coming autumn. Had he known it, Sir Howard Douglas, the then Colonial Governor, had thus founded the afterward famous Fredericton Exhibition. Even before 1827 Fredericton had had a horse racing tradition for the Cattle Show was held "on the grounds of the Fredericton Race Course on October 9th".

The year 1828 seems to have been a pivotal one for it witnessed the dedication of three buildings which have played prominent roles in the life of the city and province. The first was a more elaborate Government House to replace the one lost in the fire of 1825. An officers' barracks, opened the same year for the officers of Imperial regiments stationed in the town, still has a military affiliation through being the present quarters of the Fredericton Branch of the Canadian Legion. Last of the three was the Arts Building of the College of New Brunswick. In 1820 studies leading to the B.A. degree were introduced and the degree was conferred upon the first two students in 1828. The following year Sir Howard Douglas obtained the institution a Royal Charter and its name was changed to King's College.

Meanwhile Fredericton was becoming the centre of a growing commerce and by 1837 four steamboats were making a round trip a week between the capital and Saint John.

In the winter of 1842 Benjamin Franklin Tibbits built the world's first compound marine engine. Then, at the mouth of the Nashwaak opposite the town, he built the famous *Reindeer* with which to prove his



Fredericton's Exhibition Palace of the 1860's was modelled after the famous Crystal Palace in London.

theory of compound expansion. Within a decade of her successful trials, the carrying trade on the St. John River was a big business.

The legislative session of 1847 saw a basis laid for a provincial normal school (or teachers' college). The Model and Training School began to hold classes in Fredericton the following year.

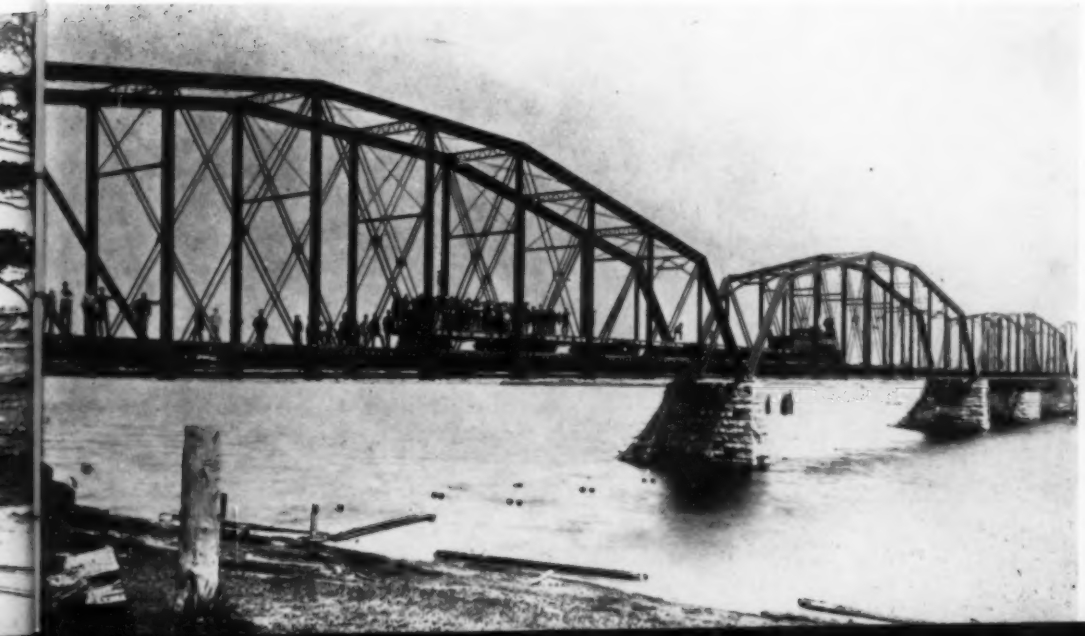
This was the Fredericton that was made an incorporated city by a Royal Warrant signed by Her Most Gracious Majesty Queen Victoria in March of 1848. As a lumbering centre it saw larger and larger drives coming down the River St. John. As a commercial town it was too busy loading and unloading steamboats to bother much about roads, except the one that led to the Miramichi. As a provincial capital it was watching the balance of power pass from the old Loyalist

A locomotive of the Fredericton Branch Railway in front of the second Exhibition Palace, October 18, 1875. The bearded man is Alexander Gibson, lumber king and industrial magnate; the younger man is Fred B. Edgecombe who later became one of the leading dry-goods merchants in the Maritimes.

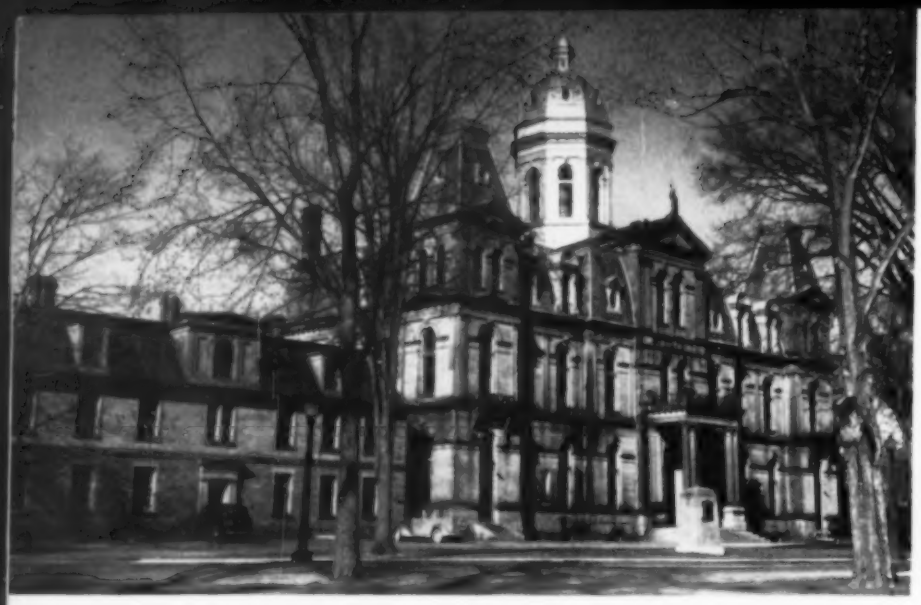
Lady Macdonald laying the corner-stone of the first railway bridge across the St. John River at Fredericton, June 20, 1887. On Lady Macdonald's right is Sir Leonard Tilley, Lieutenant-Governor of the province, on her left Senator Thomas Temple, Subdean Alexander of the Cathedral and Gilmore Brown, designer of the bridge. Seated above the pit are Sir John A. Macdonald and Lady Tilley.

aristocracy to a rising commercial class. But the legislators had already made the capital an educational centre through King's College and the founding of a training school for teachers. The legislators, too, had begun to talk a lot about railroads and to pass enabling acts for their construction, but it would be another twenty years before the capital saw a locomotive.

Meanwhile Fredericton was becoming a cathedral city. Its benefactor in this sphere was the pioneer Metropolitan Bishop of the Church of England in Canada, Most Rev. John Medley, D.D, first Bishop of Fredericton. The corner-stone of Christ Church Cathedral had been laid on October 15, 1845. Of itself it was an event unique in ecclesiastical history. With it began erection of the first new cathedral foundation on British soil since the Norman Conquest. The stone for the body walls was quarried in the immediate neighbourhood while the weatherings of the



The Canada Eastern Railway entered Fredericton in 1888. Picture shows a work train crossing the newly completed bridge across the St. John River. This structure served the railway until 1936 when it was carried away by the premature break-up of river ice and an accompanying flood.



The Legislative Building, Fredericton, erected following the destruction by fire of the old Province Hall in 1880.

buttresses, string courses and cornices are from the shores of the Bay of Fundy. All the dressings of the doorways and windows are of Caen stone, executed in England. The entire nave is an exact copy of St. Mary's Church at Snettisham, Norfolk, England. Trinity Church, New York City, contributed toward the cost of the beautiful east window. The edifice was completed in 1853 and consecrated on August 31st of that year.

Third Quarter of the Century

The Napoleonic Wars had heralded a great era for New Brunswick through the closing of the Baltic ports to England. Suddenly cut off from the timber producing countries that had until then served the wants of the Royal Navy, the Mother Country turned to the colonies in far-off America. The impetus had soon been felt in the valley of the St. John and the industry thus begun held its overseas markets with unabated vigour until the three-quarter mark of the nineteenth century had been reached.

Against this background Fredericton was growing. In 1859 the erstwhile King's College became the University of New Brunswick by an Act of the Provincial Legislature.

Then one day in 1860 the Prince of Wales (later Edward VII) sailed up the St. John River aboard the *Forest Queen* to see the bustling capital.

In 1863 the York Driving Club opened its later famous one-mile track on ground just beyond the end of Westmorland Street. About the same time a local board undertook the building of the Exhibition Palace on land adjoining the race track. When the first Palace was burned the citizenry financed a second one which shortly met a similar fate.

Between 1874 and 1876 the Provincial Government built a provincial normal school at Fredericton to meet the demand for an increasing number of qualified school teachers.

The Railroads

The first railway to serve the capital was the Fredericton Branch, which began regular operation on November 18, 1869. After completion of the Saint John & Maine Railway in 1871, "the Branch" provided Fredericton passengers with connections both to Nova Scotia and the New England States. Later it became absorbed in the New Brunswick Railway and so went to the Canadian Pacific.

The moving spirit behind the New Brunswick Railway was Alexander Gibson, the lumber baron who developed the Nashwaak, who would later give Marysville the second largest cotton mill in Canada and who would build a couple of railways to serve his expanding industrial empire.

The New Brunswick Land & Railway Company was incorporated during the legislative session of 1870 for the purpose of building a line of railway from the village

of Gibson (opposite Fredericton) as far north as Edmundston, with a branch to Woodstock. Work was begun immediately. The 54.87 miles from Gibson to Newburg Junction were completed in 1873; while the 111.83 miles from Woodstock to Edmundston were opened in 1878.

Incorporation of the Northern & Western Railway Company of New Brunswick to build a line from Gibson to Chatham had been set forth in a provincial Act of 1872. It was not until 1885, however, that Alexander Gibson began construction on the west end of the line. He pushed the work through the Nashwaak valley to Nashwaak Bridge, from there crossed the watershed between the Nashwaak and the Southwest Miramichi and entered the valley of the latter river at Boiestown. Meanwhile Senator J. B. Snowball had been laying steel westward and the two rights-of-way met near Doaktown.

While the railway was being built, Gibson and Senator Thomas Temple formed the Fredericton Bridge Company to erect a structure that would carry the rails of the new line into the capital. The corner-stone was laid on June 20, 1887. Sir John A Macdonald attended the forging of this new link in the Dominion's transportation system and Lady Macdonald was accorded the honour of laying the corner-stone. Trains began running into Fredericton in 1888.

The Northern & Western Railway was renamed the Canada Eastern in 1890. In 1904 it became part of the Intercolonial and so eventually a branch of Canadian National Railways.

Legislative Buildings

On the bitterly cold night of February 22, 1880, the old Province Hall was burned to

Top to bottom:—

Christ Church Cathedral. The corner-stone was laid in 1845 and the Cathedral consecrated in 1853. G. M. Dallyn photo.

Old Government House, built in 1828, now district headquarters for the Royal Canadian Mounted Police.

The Arts Building of the University of New Brunswick (erected 1825-28) is the oldest university building in Canada.

Their Majesties the King and Queen at Fredericton in June 1939 during their visit to the Dominion.

the ground. The buildings which now occupy Parliament Square were built immediately afterwards. The Assembly Building is a three-storey edifice topped by a Georgian dome. The assembly chamber has a high ceiling supported by massive pillars. Oil paintings of King George III and Queen Charlotte, from the brush of Sir Joshua Reynolds, flank the throne.

In the legislative library are a copy of the Domesday Book compiled by direction of William the Conqueror in 1087 and one of the two complete sets of the Audubon bird paintings now in existence. The set at Fredericton was purchased from Louis Philippe of France.

The Legislative Buildings were still new when they witnessed what, at that time, was one of the most drastic changes to be made since the founding of the province. That was the abolition of the Legislative Council (or provincial upper house) in 1891.

A further reflection of the passing of an old order was seen in the closing of Old

The Governor General, Viscount Alexander, pays a visit to the open air market at City Hall Square in September 1946. With His Excellency are (left) Mayor Ray T. Forbes and (right) Hon. John B. McNair, Premier of New Brunswick.

Lord Beaverbrook, native of New Brunswick and patron of the University, of which he has been appointed Chancellor, presents diplomas in May 1947.

Government House as an official residence. Sir Leonard Tilley, its last official occupant, vacated the old mansion in 1893. For some years thereafter its vacant windows stared an unspoken reminder of past glories. During World War I it was converted into a military hospital and in recent years it has become a barracks and district headquarters of the Royal Canadian Mounted Police.

Varied Industry

Meanwhile when the three-quarter mark of the century had been reached the beginning of a diversified industrial life was already manifest. In 1872 J. C. Risteen had opened a wood-working factory at the head of Queen Street and began turning out sashes, doors and builders' supplies. In 1873 M. Ryan & Son had begun the manufacture of brick at the west end of the city. The firm today is the Dominion's largest exporter of red brick.

"The old tannery" on the river bank at the end of Northumberland Street was the

Field Marshal Viscount Montgomery visited Fredericton in August 1946.

scene of John Palmer's entry into boot and shoe manufacture in 1877. In 1893 the company moved to a building on Westmorland Street. They moved to their present location on Argyle Street in 1912 and enlarged their plant in 1920.

In a civic way, too, Fredericton was growing. The first City Pumping Station began to supply the ratepayers with water on October 31, 1883. A newer plant was put into operation in 1906.

Three miles away, at Marysville, Alexander Gibson was changing his lumbering town into a scene of cotton manufacture. The plant which has since become known as Canadian Cottons, Ltd., began production in the autumn of 1885.

The year 1898 brought another entrant into the shoe manufacturing industry. The plant of the Hartt Boot & Shoe Company was completed that year and the first shipments of fine shoes left Fredericton in 1899.

R. Chestnut & Son, hardware merchants, had begun to experiment with the manufacture of sporting canoes as early as 1904. Successful experiments led to the launching of the Chestnut Canoe Company as a separate venture in 1907.

A third shoe factory, that of the Palmer-McLellan Shoe Company, Ltd., began production of work boots and lumbermen's footwear in 1913.

Construction of a new post office building by the Dominion Government in 1914 completes the picture of Fredericton's growth to the time of the first great war.

Between the wars Fredericton's predominant mood seems to have been a somnolent one, as though she were rapt in a contemplation of a glorious past. The water of the great river lapped quietly upon her front doorstep; and there was a lulling sigh among the tall trees on the hillsides which rimmed the town flat.

Sport

In the long summer days the sun shone brightly and in the "quiet years" sport in Fredericton came of age. The Fredericton Curling Club had been a sporting institution since Christmas Eve 1854. The Fredericton Golf Club, organized in 1916, grew rapidly in the years that followed the Armistice.

Local fans saw big time baseball played by the Fredericton Capitals in the years around 1920. The rugby team of the University of New Brunswick brought home the MacTier Cup in the autumn of 1926. Hockey fans still talk about the Fredericton Millionaires and the great crowds in the old Arctic Rink around 1930.

After the burning of the second Exhibition Palace in the 70's, the Fredericton Exhibition had pursued a modest but continuing course until 1915. In 1886 the Fredericton Park Association had opened the present half-mile oval and begun to develop sulky racing in connection with the fair. The war over, both the Exhibition and the harness racing were resumed in 1919. In the two decades that followed the Fredericton track won national and international renown.

Visits of wealthy sportsmen both from the United States and the Old Country had led New Brunswickers to an early appreciation of the fish and game resources of the province. In January 1901 a group of the leading woodland guides met at Fredericton and there formed the New Brunswick Guides Association, the first such body on the North American Continent. In 1927 the movement found expression on the provincial level in the founding of the New Brunswick Government Bureau of Information by the late J. Douglas Black. At present the Fredericton Chamber of Commerce conducts an active tourist bureau.

The charter members of the New Brunswick Guides Association, first organization of woodland guides on the continent, photographed in January 1901.

The bay gelding, Walter Dale, photographed at the Fredericton track after setting a new record for half-mile tracks in September 1937.

Modern Times

Fredericton had had some growth even in the "quiet years". On the afternoon of May 2, 1929, the Provincial Normal School Building was destroyed by fire. In the years immediately following a new building rose on the site.

In the 30's when the New Brunswick Government issued bonds for the building of hard surfaced highways, one of the first major projects was the section of Trans-Canada Highway No. 2 extending from Edmundston via the St. John valley to the Nova Scotia border. Completion of this project gave the capital city a paved approach both from east and west.

The night of March 19, 1936, is still remembered in Fredericton as "the night the bridge went out". Unusually heavy ice floes and a spring freshet a month ahead of its time destroyed the railway bridge that Alexander Gibson and Senator Thomas Temple had undertaken back in 1887. When Canadian National Railways completed and opened a new structure on June 1, 1938, Fredericton had acquired a heavy duty link with the railway lines in the central and eastern parts of the province.

On June 13, 1939, the capital city took a holiday and welcomed Their Majesties, King George VI and Queen Elizabeth.

Riding the crest of a wartime boom, the city and the growing town of Devon on the east side of the St. John River became one corporate body on July 1, 1945. A good thing for Fredericton, too, the Devon folks said.

"Up the hill" the University of New Brunswick faced post-war problems. From a total enrolment of 350 a decade ago, the influx of student veterans had run the total up to 1,400 by 1946. Expansion had to be rapid, even spontaneous. The erstwhile sacred campus was built up with hastily transplanted army housing. That was not enough.

On the outbreak of war in 1939 the army had taken over the plant of the Fredericton Exhibition. Late the same year the old fair plant had been burned to the ground. It was replaced at the time by army housing. Now with the war over and the army moving out, the University promptly moved in. The sign over the old Exhibition Ground entrance now reads "Alexander College, University of New Brunswick."

The Canadian National Railways bridge across the St. John River which was opened to traffic in June 1938.

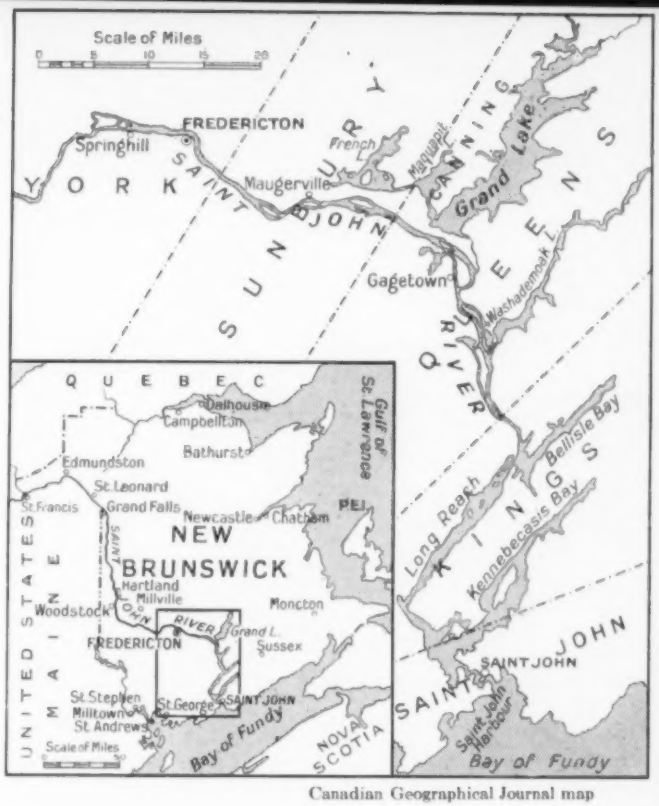
With the rise of a major pulp and paper industry in New Brunswick, the University after 1920 had developed an outstanding school for forestry. Since the end of World War II this has been further extended and a separate Forest Ranger School has been built where short courses are available to men intending to enter woods work. Financing was a joint effort of the Province of New Brunswick, the Province of Nova Scotia and the leading pulp and paper companies of the two provinces.

In recent years the University has enjoyed the patronage of the Rt. Hon. Lord Beaverbrook—first in the form of a residence for men and later a gymnasium, in addition to a number of scholarships. During the encaenial exercises of May 1947 His Lordship in turn was invested as Chancellor of the University with fitting ceremony.

During the second half of the nineteenth century three poets whose work would gain world-wide recognition were born in Fredericton. They were Sir Charles G. D. Roberts (1860-1943); Bliss Carman (1861-1929); and Francis Joseph Sherman (1871-1926). A memorial erected on the University campus by the Historic Sites and Monuments Board of Canada and unveiled during the same encaenial exercises of May 1947 acknowledges Fredericton "The Poets' Corner of Canada". The driving force behind this tribute was Dr. J. Clarence Webster, of Shediac, New Brunswick.

Queen Street, main thoroughfare of the city.

Waterloo Row, in the residential district.



Canadian Geographical Journal map

Industrial Growth

The Fredericton of today is a dignified provincial capital, graced by Georgian architecture, whose one-time river traffic has found new outlets in a developing system of railways and paved roads. The trains and the highway traffic bring in an endless procession of students, tourists, building supplies and raw materials and take away graduates, homing tourists, boots, shoes, souvenirs and carcasses of game in season. It is an educational town where a growing university has gobbled up an exhibition plant; a commercial centre whose council is encouraging the development of light industry.

Ray T. Forbes, Fredericton's rather youthful Mayor, says the city to date has had no industrial disturbances, although it still has an adequate number of working folk in its population. The city has the lowest civic tax rate in the Maritime Provinces and the council upon occasion are favourable to exemptions as an inducement to new industry.

Indeed a socio-economic chain of cause-and-effect is operative at the present time. New industries, principally based on wood, are attracting a new community of workers. The newcomers are forcing a major housing project. A couple of new sash-and-door factories are already catering to the building trades. Looming in the immediate future are dial 'phones, a civic airport and a new provincial building.

Old Governor Carleton was a stubborn Englishman. The passing years have wrought a curious plan of living on the town flat which he staked out long ago in the bend of the broad river.

Collectively it's called Fredericton.

That is what the band playing, the fireworks and the speech-making will be about this coming July.

One of the many industrial plants.

The Chamber of Commerce tourist bureau in Wilmot Park.

The West Suk of Kenya

Teaching a Primitive Tribe to be Better Farmers

by G. H. CHAUNDY

I SHALL always remember arriving at Kapenguria, the administrative headquarters of the West Suk district, with my box body car piled high with my belongings. This was in January, 1931, and the station had recently been moved from a hot, feverous, unhealthy place on the plains to Kapenguria, a cooler place in the hills. Buildings were being put up, but no houses were ready for European officers, who had to live in tents. The school which I had come up to organize, was being built by a gang of African artizans.

My first duties were "to make a close study of the West Suk tribe to see how the new school could help the people both socially and economically". The District Commissioner told me the Suk were very backward and conservative to a degree, and apathetic to any schemes suggested for their advancement. He warned me that it would be a long, uphill fight to win their confidence. They were completely illiterate, and there were not even any Missions working in the district at that time. So I set out on a tour of the district, and as there were no motor roads, I went everywhere on foot. I began to learn the Suk language and studied the customs of the people.

Contrary to reports I found the district comparatively well watered, especially the higher areas, but the people were doing little from an agricultural point of view. They owned large herds of cattle, sheep and goats, but when I first toured the district these animals were in an emaciated condition owing to depredations of locusts and a prolonged drought. The people grew only two

Left, top to bottom:—

Much top soil has been washed away through ill-advised clearing on steep hillsides such as this.

A gully formed as the result of burning the catchment area of a small stream.

Cattle and camels drinking at the Loyapuya ford of the Turkwell River.

crops: finger millet (*Eleusine coracana*) on the steep hillside, and greater millet (*Sorghum vulgare*) by irrigation on the flat land. They chose the forested banks of the streams for cultivating finger millet. During the dry weather they cut down the undergrowth and set fire to it. Then they merely scratched the surface of the soil with primitive hoes or digging sticks. As soon as the rains came they broadcasted the seed. After harvesting the crop, they moved to another piece of forest. In this way they were gradually destroying the forests in the catchment areas of the streams with the result that the streams were no longer permanent—they rushed down the hillsides during the rains, carrying much soil, but dried up soon after the dry weather set in. The greater millet was planted on flat land and usually two crops were grown per year. The people relied on the rains for the growth of the first crop which was planted in April, and irrigation was only resorted to when there was a dry period, but the second crop, though planted before the rains were over, was irrigated during its later growth. It was a crude but effective form of irrigation, and judging by the large trees seen along the banks of the furrows, it must have been practised for a considerable time. Main furrows were dug from the streams coming down from the mountains just before they reached the

At top:—The Molo River separates the overgrazed Kamasia reserve on the left from the tended, settled area on the right.

Right:—Result of overgrazing. Little grass remains.

The new method. Bunds placed across the slope at intervals follow the contour to stop soil wash.

Kapenguria school farm. The main talks pr has been harveste hey will

plains. These main furrows were taken out roughly at right angles to the streams, and from them smaller furrows were constructed. In this way it was possible to irrigate a considerable area of flat land on the plains, and there was little soil erosion.

The people were definitely famine stricken and were eating anything they could find, including berries from trees, and rats; they even readily devoured a baboon I shot one day. I held meetings and spoke about the new school, the urgent need for improved agricultural methods, and the introduction of new crops to provide a better balanced diet. But they took little interest in what I said, as I was a complete stranger to them. Some of the Chiefs did promise to send their sons to the new school, mainly because of the prevailing food shortage.

When I returned to Kapenguria, I found over forty boys wished to be admitted to the school, but as there was accommodation for only thirty, temporary huts were erected to house the remainder. As a result of my tour of the district, I came to the conclusion that the new school should have a pronounced agricultural bias, and for the first few years I should be satisfied if I made the pupils literate and gave them a good training in practical agriculture. So we started a garden on some flat land near the school. I worked with the boys and helped with the initial clearing and digging. They became so keen that they asked if they might start

Part of the school vegetable garden showing a variety of crops. They have been mulched with dry grass to prevent loss of soil moisture in the hot sun.

The inst and We plo

mai talks provide soil cover after the crop
ester they will be dug in later.

Agricultural demonstration plot, showing contour ridges. The native instructor's hut is in background.

gardens of their own. These were measured out and the area fenced to prevent wild animals from eating the growing crops. We harvested a bumper crop of English potatoes and at that time many Suk came to visit their friends at school not, I fear, to see how they were progressing, but to have a good feed. This helped to make the school popular amongst the Elders, and it came to be known as "The place where you eat potatoes".

I made many more tours of the district that year, and felt I was beginning to gain the confidence of the natives. But I was alarmed at the eroded state of the grazing areas, the way the people were destroying the forested catchment areas of the rivers, their precarious way of living and their poor physique. It was obvious that it would be some time before ex-schoolboys could have any appreciable effect in remedying these defects. At a meeting of the local Native Council held in August, 1931, I therefore outlined a scheme for helping the people to augment their food supply, and at the same time conserve their soil. This was that each location should have its own agricultural demonstration plot and seed bulking form. It was explained that the benefits would be threefold: (1) to introduce new crops to the district; (2) to teach the people improved methods of agriculture, special attention being paid to soil conservation, and (3) to bulk seed for distribution. With the exception of one member, who said he would give

The African agricultural instructor's hut, kitchen and seed store at the Weiwei demonstration plot.

Seed distribution day. The man in foreground carries a bundle of maize and a bundle of groundnuts.

it a trial, the remainder, owing to sheer laziness, said they did not welcome my suggestion.

Early in 1932 a native agricultural instructor was posted to the district and the first plot begun in a fertile valley. At first the people put every conceivable obstacle in the way. However, an area of about four acres was cleared, fenced and prepared for planting. The following crops were tried: yellow maize which was interplanted with rose coco beans, groundnuts, sweet potatoes, cassava, pigeon pea and bananas. Good yields were obtained, and the people were given the various crops to sample. The Suk in other parts of the district soon heard that the new crops were good to eat, and at a meeting of the local Native Council held in August, 1932, six more Chiefs asked if I would start plots in their locations. I promised to do this if they voted money to pay the wages of the instructors who were being trained at the Kapenguria School.

In 1933 six more demonstration plots were started with ex-schoolboys in charge. The sites were selected and personal supervision given to clearing, fencing and preparing for planting. There were now seven

Wheat did well in the cooler parts of the district. The author among the stooks.

SUCCESSFUL CROPS

Above:—Yams did well.

Top right:—A good maize crop. Beans grow between the rows and provide good soil cover.

Bottom right:—Onions ready for storing. Two varieties did well, the Yellow Bermuda and the Early Hunter River seen in picture.

Below:—Some large pumpkins.

Distribution day; natives receiving their quotas of seed potatoes.

plots in all, three of which were in the hills (altitude 6,000 to 7,000 ft.) where sub-tropical crops were grown, and the other four in the lower, hotter, plains. Each year steady progress was made and more demonstration plots were made but it was four or five years before any of the introduced crops were planted by the people on a large scale. Gradually they began to realize that better methods of cultivation produced good results. They are now planting a large variety of crops which give them a well balanced diet. Certain rules were passed by the local Native Council some years ago to ensure the continued conservation of agricultural land. The rules, which are obeyed by the people, stipulate that all fields on slopes must be contour ridged to prevent erosion, that no cultivation is allowed near streams, that no one may destroy the primeval forests, and that all catchment areas of rivers are to be protected.

As soon as the people were growing enough food for their needs, and following improved methods of cultivation, attention was turned to the eroded grazing areas, and the culling of useless stock. In one of the badly eroded areas, where the vegetation cover had almost disappeared mainly owing to overgrazing, a plot of about an acre was enclosed in 1935. In three years the indigenous grasses had spread all over it. When the Elders saw this, they agreed to close the greater part of an eroded region by putting a thorn fence around an area of approximately 35 square miles. In 1941 further areas of eroded country were rested amounting to some 60 square miles in all. Grazing guards patrol these areas to see that no stock enter them. They are also in charge of tree plantations where experiments are carried out to see what type of drought-resisting trees and fodder plants will thrive. Resting the eroded grazing, thus giving it time to recover, and at the same time selling surplus stock, both cattle and goats, have eliminated the danger of desert conditions ultimately prevailing in West Suk. On the contrary the grass cover will improve each year, provided rainfall is normal and visits of locusts are not too frequent.

In the meantime the school farm was being developed. Cattle were introduced in 1935 and mixed farming begun. This side

of the work has progressed each year, until today there is a flourishing farm where the pupils receive practical instruction in the maintenance of soil fertility, the improvement of milk yields of cows, soil conservation work, and related problems.

After the boys left the school I used to visit them from time to time on the land where they were working. Encouragement and advice given to them in this way was a most important supplement to their training. A large number of boys who have been through the school are now successful farmers. A medical officer who toured the district recently stated that he considered the Suk one of the healthiest tribes he had met, largely because they lived on a variety of foods. He reported that the district presented a well cared for appearance and he was impressed by the amount of soil conservation work being done by the people.

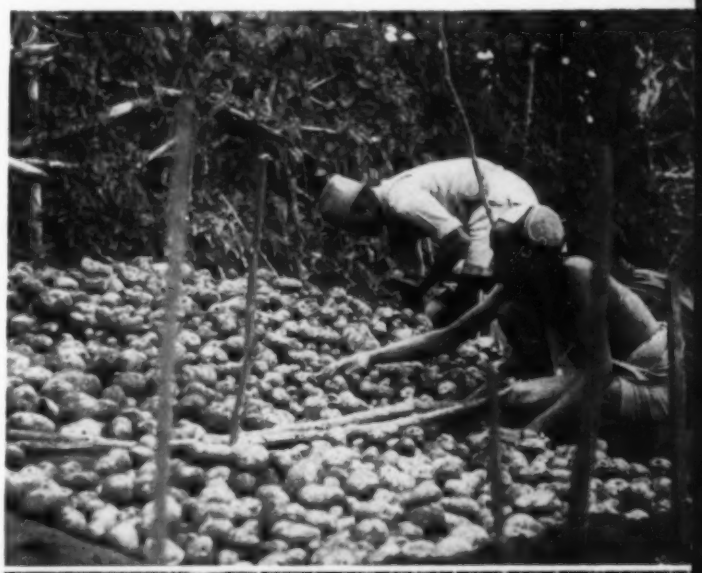
I left the West Suk District at the end of 1943, and shortly afterwards my successor formed an Old Boys' Club. At its first meeting the secretary was asked to write and thank me for all I had done for the Suk during the thirteen years I was there. May I quote from his letter: "When you arrived as a stranger you saw the need for teaching the people to grow food, but you found the work very difficult at first. Then the men and boys began to like cultivating the land. Nowadays you will see fields on each side of the road. Thank you for helping our country for a long time. Please send us your photograph, the same size as the one of King George VI, so that the children of our tribe will always remember you".

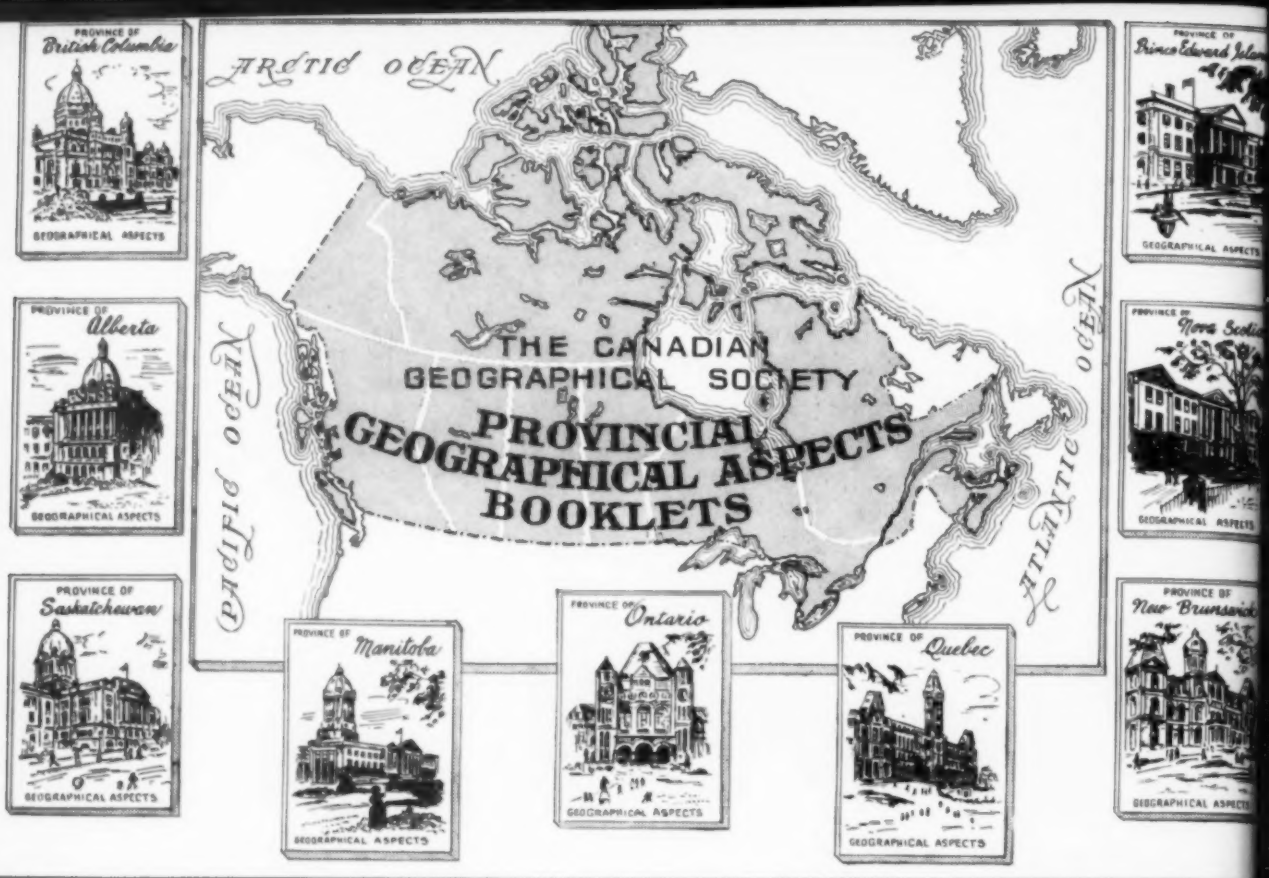
POTATO CULTIVATION

Right:—Native instructor showing Suk how to sort and grade the potato crop.

Bottom right:—Boys of the school spacing potatoes in the row.

Below:—Untrained Suk receive a lesson in potato planting. The African instructors are in uniform.





AN ANNOUNCEMENT

IT is with pleasure and pride that The Canadian Geographical Society announces publication of its new Provincial Geographical Aspects booklets. Printed on the same quality paper and page size as the "Journal" the set comprises nine booklets, each presenting in graphic form the varied geographical aspects of one Canadian province. Each booklet contains 32 pages, is profusely illustrated and has a map of the province. The subject is treated in comprehensive manner, touching on historical, physical, economic and human aspects of the province, with sections on topography, climate, natural resources, industries, cities, etc. Leading authorities in every field have collaborated in preparation of the articles and the result is a concise, reliable, up-to-date survey of Canada from coast to coast. In order to be of maximum usefulness the booklets are written in simple language within the range of school children.

Sets of booklets, entirely free from advertising matter, may be ordered now, for delivery after March, 1948. It is suggested that orders be placed early as the run of the first edition is limited.

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EDITOR'S NOTE-BOOK

G. H. Chaundy, MBE, B.Sc. Agriculture (London), was first posted to West Suk district in January 1931 as Education Officer. On his many tours of the district he found the people under-nourished and their agricultural work extremely primitive, but he gradually gained their confidence and set up a school with a strong agricultural bias. Demonstration plots were inaugurated and the people encouraged to follow improved agricultural methods. Mr. Chaundy left the West Suk district at the end of 1943.

* * *

Fred H. Phillips has long been interested in the sidelights of history as it is concerned with his native province of New Brunswick and his free-lance writing is chiefly in the form of historical and biographical work. After a year of newspaper work on the *Fredericton Daily Gleaner* he joined the New Brunswick Government Bureau of Information which he still serves, after an interlude of war service in the army overseas.

* * *

AMONGST THE NEW BOOKS

Report of the National Parks Committee (England and Wales) 1947
(H. M. Stationery Office, York House, London W.C.2, England, 4s.6d.)

The attention of our readers is drawn to the report of the committee which studied very thoroughly the many problems connected with the establishment of national parks in Britain, and delved into the history of national parks in other countries. In addition to the very interesting report which contains many beautifully written descriptive passages, the volume includes detailed appreciations and maps of each of the twelve proposed parks, and a map of Great Britain showing the areas under discussion.

M.B.

* * *

Devon and Cornwall
by JOHN MURRAY *et al*
(Wheaton & Co., Exeter, England, £1:11:6)

Though referred to as a "preliminary survey", this is a remarkably detailed scrutiny of the two south-western counties of England, their physical characteristics, their people, their industries. The study was undertaken by the Survey Committee of the University College of the South West, at Exeter, as a self-imposed war task in preparation for post-war reconstruction.

There are numerous maps, charts, and tables, and literally hundreds of aspects of the various problems confronting the inhabitants of this area are considered. Those of us who automatically associate Cornwall with tin (and who doesn't ?) will be surprised to find that there are but three tin miners in every thousand employed persons, and many another curious fact is to be found. Though an excellent piece of work, both in research and in production, it is largely of local interest and utility, except perhaps as a model for the use of others who wish to carry out similar investigations.

DOUGLAS LEECHMAN

* * *

When the Fish Are Rising
Tales of the Rideau Lakes
by CLINT FLEMING
(Collins, Toronto, $3.50)

THE amateur of the woods and lakes, who finds his sport under his own power, and takes his game by his own amateur devices, regards with awe the professional guide. In all truth the profession of guiding must be an exacting one: not only must the guide be an expert in the ways of fish and game and wild fowl, and in the art of capturing them, but he must be philosopher and friend, steward and cook; in addition, if nature has been kind enough to endow him with the properties which class him as a "character" to be quoted in the clubs and gun rooms of another land, he is established in the top flight of his craft. We think that our author must have all these skills and characteristics and he certainly has the ability to tell a tale.

(*Continued on page IX*)

ANNUAL MEETING of

The Canadian Geographical Society

The Society will hold its nineteenth Annual General Meeting in the Lecture Hall, National Museum of Canada, Ottawa, on Friday, February 27th, 1948, at 8.30 p.m. Immediately following the meeting Dr. Trevor Lloyd, Chief of the Geographical Bureau, will deliver an address entitled "West Greenland and Canada", illustrated by slides. The meeting will conclude with the first showing of the colour-sound film sponsored by the Society, "Men of Lunenburg".

(*Continued from page VIII*)

Mr. Fleming's book is made up of a series of sketches, sixteen in all, of fishing and hunting, related adventures and associated yarns, in and about the Rideau Lakes district of Ontario. It would steal his thunder, and perhaps lose him the royalties on the book, if one were to attempt to summarize any of these chapters. They are all, and uniformly, excellent, bringing to the winter-bound sportsman the thrill of a fish on the hook, or a bird swirling down to the decoys, and all told in a simple unaffected English that is a delight to read.

Residents of the Ottawa Valley may wonder why he selected the Mississippi Snye for a trapline, since it is only about four miles off the King's Highway and six or eight from Arnprior. Possibly the Snye was dragged in only to give a background for the story of the race between the moose and the team of horses and the subsequent bickerings and blood-lettings on the snow white ice of the Ottawa. If so, it was quite worth it. Happily, we can enlighten Mr. Fleming on the meaning of the word Snye. It is a corruption of the archaic French word "chenaye", meaning a channel, and is used in many parts of Canada to describe a side channel, usually with a current easier than that of the main stream. The Snye of the Mississippi does not quite conform to that definition, but it is an excellent Snye for all that.

Highly recommended. P.E.P.

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PRESIDENT

Life Among the Scots
by JANET ADAM SMITH
(Collins, Toronto, $1.35)

AS ONE expects, in the "Britain in Pictures" series, Miss Adam Smith's story of the social life of the Scottish people from the earliest records to the present day is a little masterpiece of workmanship, illustration and literary excellence. The rare prints and coloured plates complement perfectly her witty and learned discussion of the several periods into which she has divided her book.

In Before the Reformation she points out how "poverty and hard living" remarked by French knights who landed in Scotland in 1385 were dictated by the geography of the country. Yet by the time of James IV (1488-1513) the wealthy monasteries, the rich town burgesses and noblemen had attained a degree of cultivation and rough comfort. Already there were universities at St. Andrews, Glasgow and Aberdeen. The author notes traces of characteristics usually attributed to Calvinism, the strict Scottish Sabbath, the suspicion of pleasure for pleasure's sake.

In After the Reformation we are on more familiar ground, the social life of the seventeenth century, especially its absorption in religion, being the theme of many a volume of romance and history. One likes Miss Adam Smith's treatment of this knotty subject. She has such a keen eye for her countrymen's strength and weaknesses and a true appreciation of their great qualities. For instance, "The Reformation bestowed one major pleasure on the Scot—a taste for religious argument and controversy . . . this taste together with a conviction that religion was really the most important thing in life resulted in the schisms and disruptions that have so marked the history of the church in Scotland."

Equally skilful and delightful is her appraisal of the achievements of the eighteenth century. In 1707, Scotland without king or parliament, threatened to become a poor little annex of England. By the end of the century she had become the centre of economic, social, and literary activity that drew the eyes of Europe. New methods of agriculture changed the face of Scotland, and her society was inspired by a growing band of writers and artists to such a development as attracted visitors and students from England, Europe and America.

The remainder of the book is devoted to a moving account of the Highlands and the break-up of the old clan economy, while the concluding section brings a vigorous discussion of present-day Scotland, particularly happy in its characterization of Glasgow, Edinburgh and Aberdeen as representing differences in national life, their various stirring new enterprises and the changes wrought by the war. F.E.F.

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ERRATUM—January issue, 1948, page 5: illustration in lower right hand corner shows a fisherman holding a sucker, not a whitefish, as stated.